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OCTOBER 1984

VOLUME 2
ISSUE 10

THE INDEPENDENT GUIDE
FOR **APPLE** COMPUTING

INCLUDING MACINTOSH COVERAGE

# Linking Apples To Mainframes

## SCALING THE HEIGHTS

- LETTER-QUALITY MAC OUTPUT
- ROAMING THE BOND JUNGLE
- APPLES RESTORE ARTIFACTS
- MAC CLIP-ART PROGRAMS
- INFORMATION: THE FINAL FRONTIER
- APPLE LOGO II
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- REVIEWS: DB MASTER TITAN EMPIRE JURY TRIAL II

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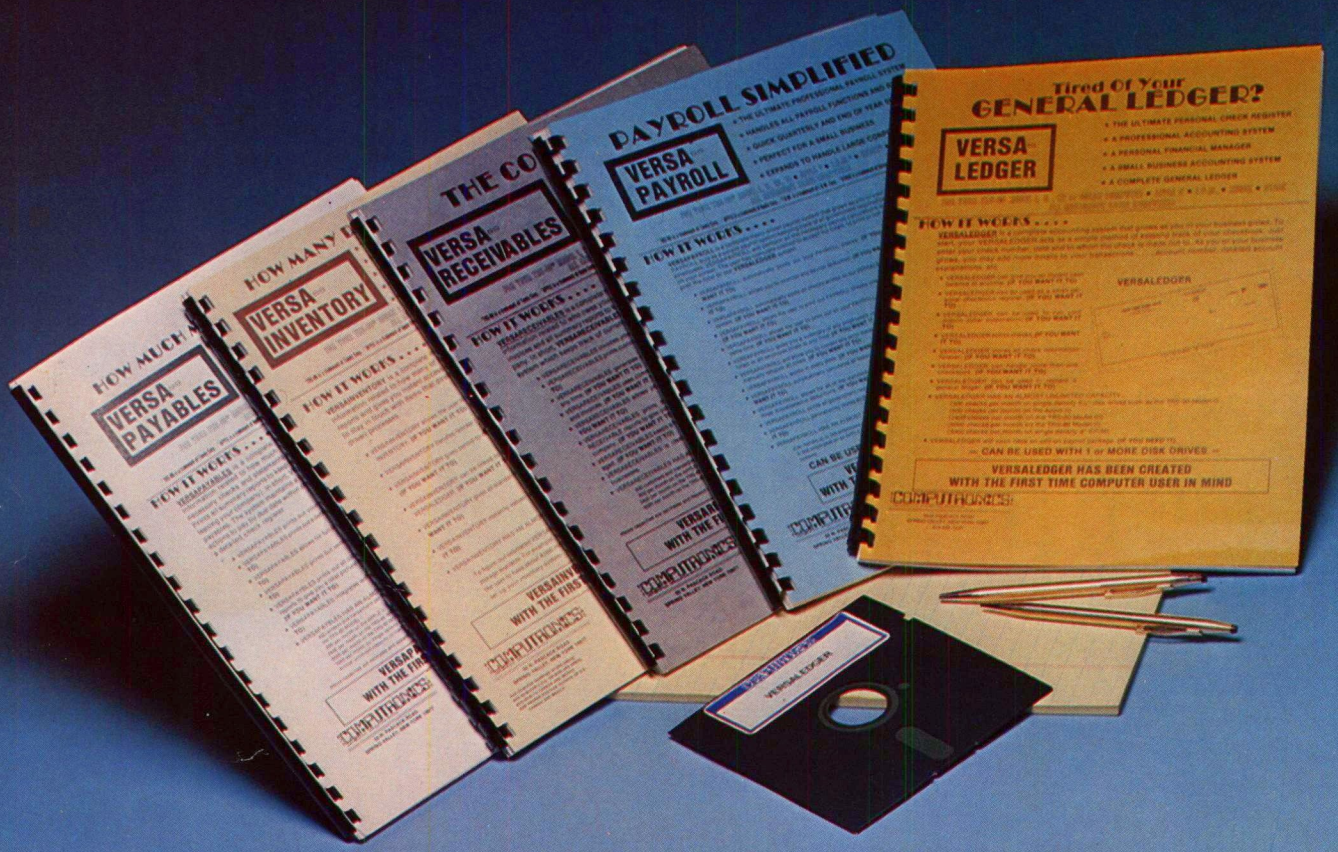


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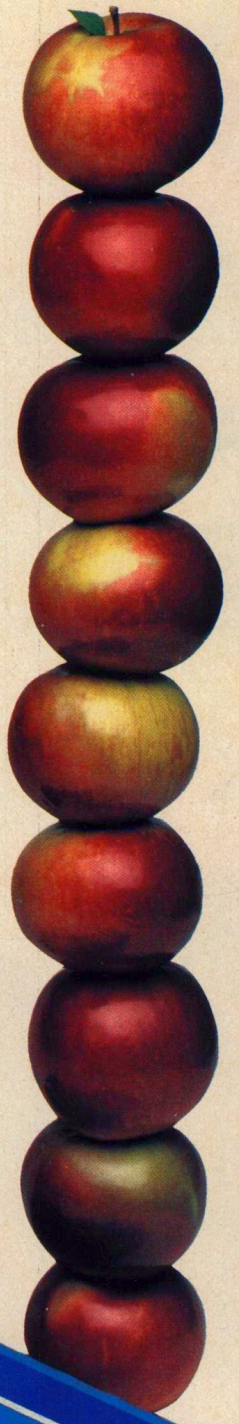

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*ETC Software*
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- ETC MC68000 System Monitor
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- Apple DOS 3.3

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*Hardware*
- 1 Megabyte RAM (Fall 1983)

*Software*
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- FORTRAN
- BASIC
- Unix-like Operating System
- Artificial Intelligence Laboratory incorporating a Deductive Reasoning System
- **CP/M 68K with C Language**
- UCSD Pascal

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VOLUME 2/ISSUE 10/OCTOBER 1984

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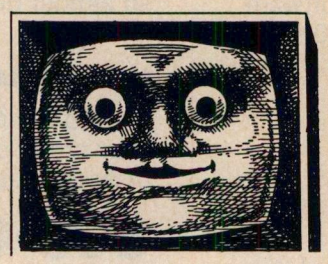


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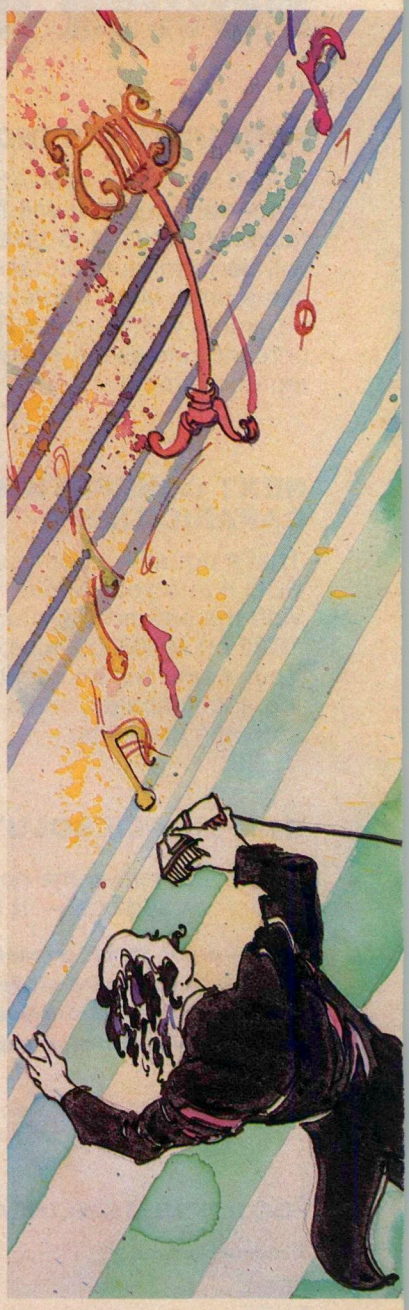

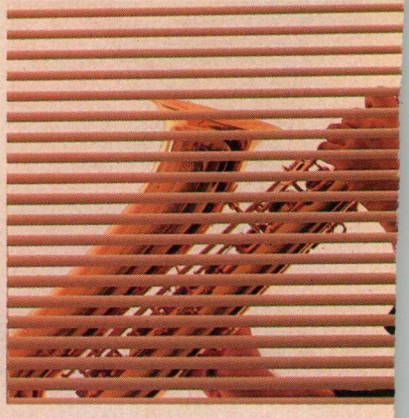

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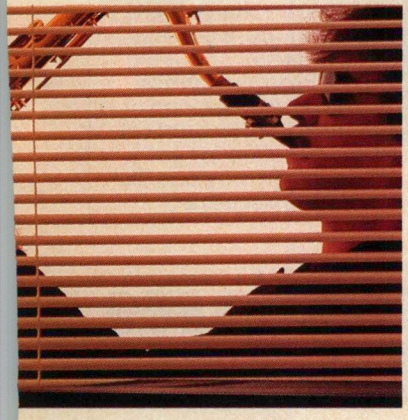

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**Your Personal Net Worth** systematizes the management of your household income, expenses, credit cards and check books — using methods tested for accuracy by Touche Ross, one of the nation's leading accounting firms.

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**You'll find it at your favorite software retailer in the silver box with the real silver dollar on the front. It could be the single most valuable purchase you'll ever make.**

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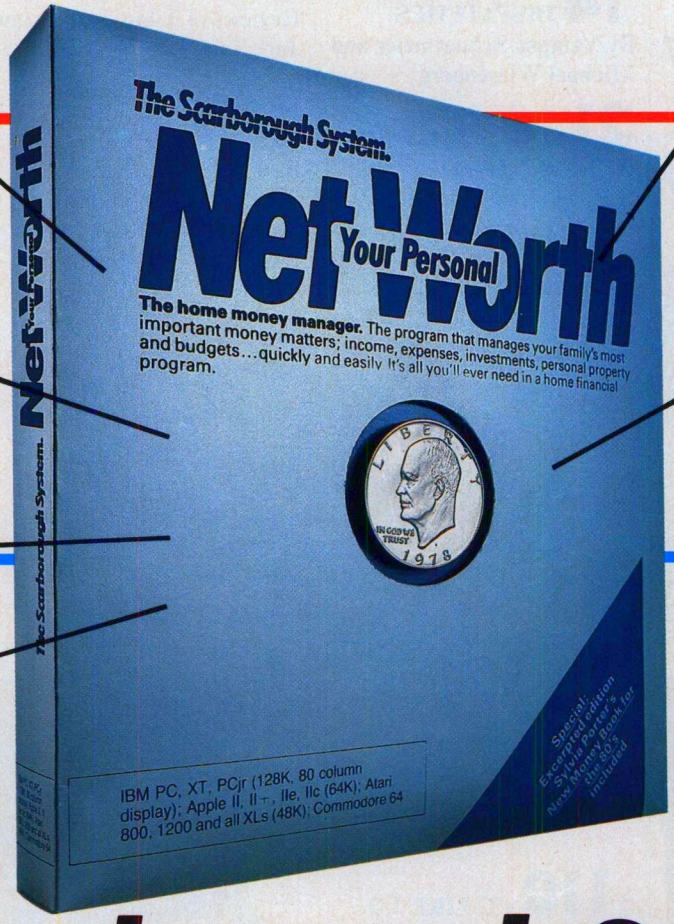
**Set up a budget (as many as 350 categories) — and then compare your actual income and expenses to the budget.**

**Never forget a tax-deductible item. Today or at tax return time.**

**Display or print every financial report you'll ever need.**




**Record stock, bond and other investment transactions. Inventory household valuables, collectibles and important papers for insurance and other purposes.**

**Your Personal Net Worth works fast because it's in machine language. Documentation in plain English is referenced for easy use. "Help" functions on screen at all times.**

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Commodore 64
Atari (48K)
The Program comes with two disks, one of which has accounts already set up for entry. However, only one disk drive is necessary.

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Fabian Cooperman

**Art Assistant**
Peter Archer Phillips

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Advertising Office
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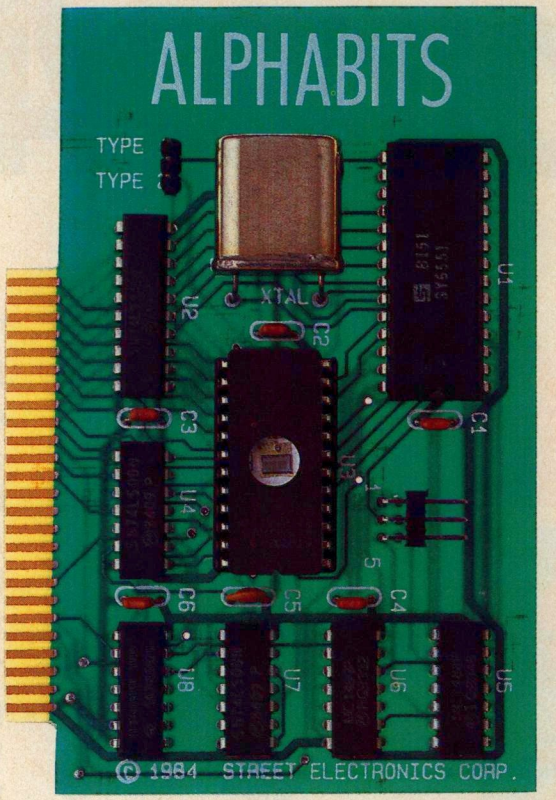


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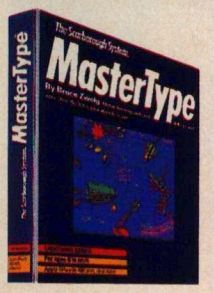


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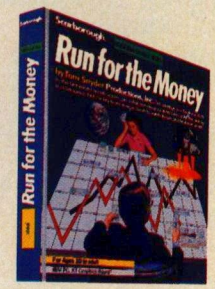


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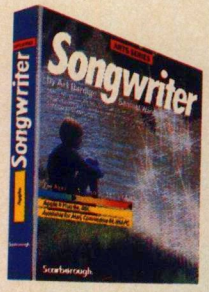


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*National Education Association Teacher Certified Software.

**MasterType**
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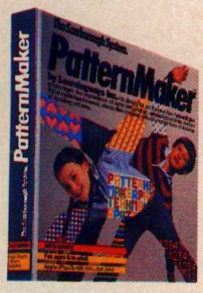


**PatternMaker.**™ An amazing software program. It's geometry. It's art. It's great fun. Kids can build dazzling patterns and learn a lot. PatternMaker builds a foundation that can be applied to many professions and crafts. It challenges creativity and effectively teaches symmetry, color and design, and it's just as much fun for grown-ups, too.

Our programs are available for: IBM-PC/ PCjr, Apple II family, Commodore 64, Atari.

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Name of Principal_____

Name of School_____

Address (school address only)_____

City_____ State_____ Zip_____

Software will be sent only to verifiable school addresses.

*Offer Expires Dec.* 15, 1984

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Check product to be sent to school:
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☐ PatternMaker ☐ PictureWriter† ☐ Run for the Money

† Apple only.

Make check payable and mail to:
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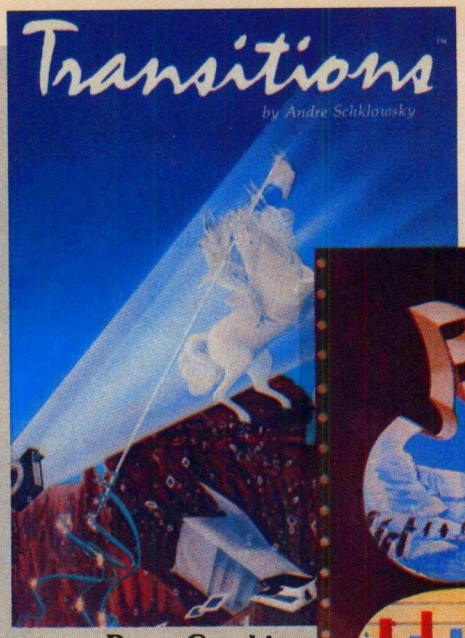
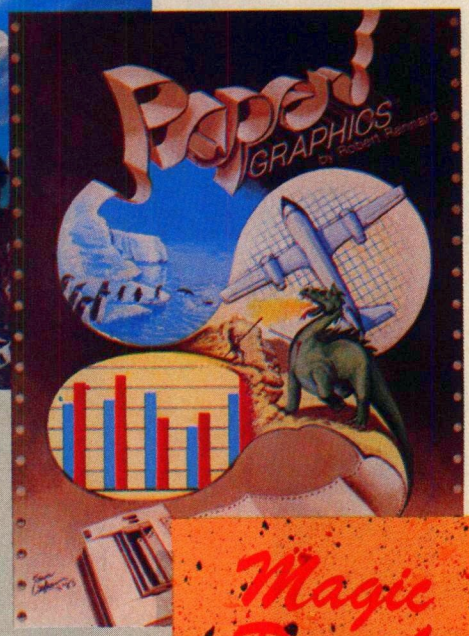



**Transitions**
Dynamic slide show editor allows you to pack, arrange, and display pictures, using 44 different screen transitions.

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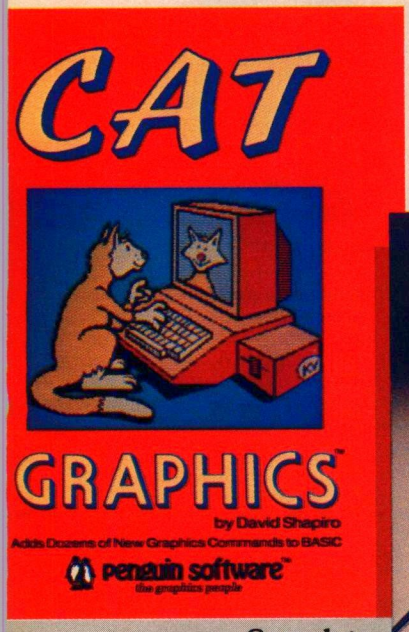
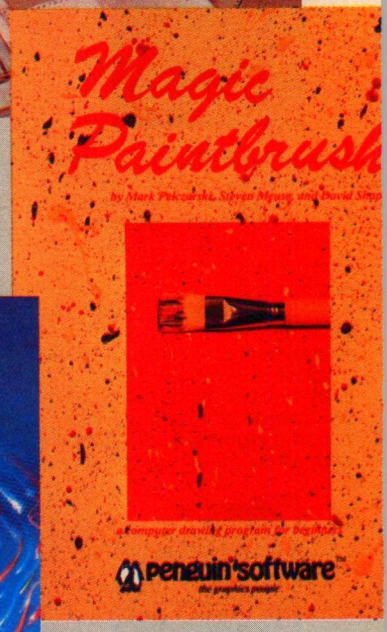
Print screen images on virtually any printer, using almost any interface card. Advanced cropping, annotating, and magnify features.




**Cat Graphics**
For the programmer. Adds 55 new graphics and sound commands to BASIC, such as Circle, Fill, Magnify, and others.




**Magic Paintbrush**
Draw and paint with over 100 colors. So straightforward and simple that a child can use it.

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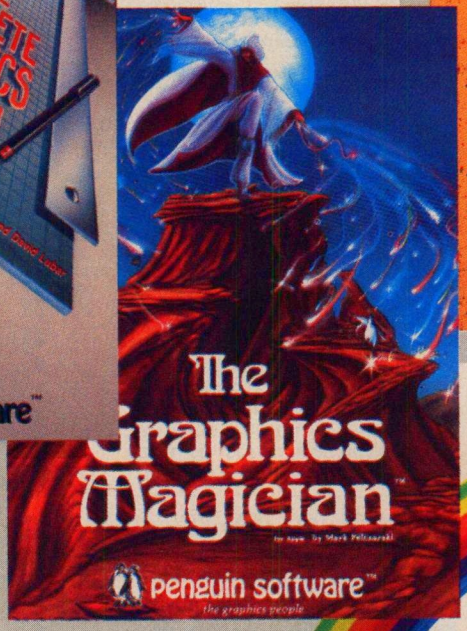


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# EDITORIAL
# A MESSAGE FROM MAGGIE

Are you a new Macintosh owner and worried about the lack of software and hardware peripherals? If so, put your fears to rest. New and innovative products are now available, and more are in the making.

Getting working products for the Mac out the door has been much more difficult than third-party vendors anticipated. To prepare the product chart that ran in our June issue, we asked third-party developers when their products would be available. Unfortunately, very few met their own projected release dates, and we received several letters from readers asking us how we had arrived at the dates we printed. I can now tell you with pleasure, that through perseverence—and with help from Apple—software and hardware vendors are shipping all sorts of interesting products. I saw some of these products in July at the National Computer Conference in Las Vegas, where Apple featured a virtual parade of new products each day in its booth.

One of the most impressive offerings, a filing system called Filevision, is from a company called Telos, in Santa Monica, California. Using Filevision with the Macintosh's tremendous graphics and object-oriented drawing abilities, you can make visual representations of your data. Since not many of us are artists, Filevision provides several templates (a map of the U.S., for example), and more are in development. According to Telos, Filevision will be available by the time you read this.

In addition, an array of familiar hits has made the transition to the Macintosh screen. These include Microsoft BASIC and Multiplan, Stoneware's DB Master, MegaFiler from Megahaus, Tax Planner from Aardvark/McGraw-Hill, Software Publishing's popular PFS:File and PFS:Report, Dollars and Sense from Monogram, and ThinkTank from Living Videotext.

Whole new genres of software for the Macintosh are emerging. Two distinct ones are graphics diskettes (sometimes referred to as clip art) and desk accessories, both of which take advantage of the Mac's "user interface."

Graphics diskettes are ready-made art and other images, such as maps, arrows, borders, cartoons, and a diagram of a typical home. Mac the Knife from Miles Computing and CLIP 1 from Frazier, Peper & Associates are two examples of graphics diskettes. (See "Leave the Drawing to Us" in this issue.)

By pulling down the Mac's Accessory menu, you can select desk accessories such as an alarm clock, a calculator, and a puzzle. Videx, recognizing the power and convenience of these desk accessories, has developed Desktop Calendar. Because it runs as part of the desk accessories in the background, Desktop Calendar does not interfere with application programs. Thus, by pulling down the Accessory menu, you can look at your calendar without having to load in a program. Megahaus offers a collection of three desk accessories in a package called MegaDesk.

The Mac elicits creativity by the very nature of its design, and nowhere is this ability to inspire more apparent than in Koala Technologies' MacVision, an image digitizer. Bill Atkinson, author of MacPaint, wrote the MacVision software, which augurs well for its quality.

Two other products illustrated the spirit of the Macintosh—Oberon International's Omni-Reader, a hand-held optical character reader, and the MacPhone from Intermatrix (the Artsci folks), a telemanagement system. Omni-Reader reads text into your computer, bypassing the data-entry stage. Applications include inputting typewritten pages into the Mac, transferring text between incompatible computers, inputting tables of data, storing and editing documents for electronic filing, and so on.

MacPhone finally brings together the phone and the computer. MacPhone dials your phone for you; logs in phone calls you receive, with name, date, and duration; and provides a built-in calendar with three-month display, including appointment book and notepad, a memo writer—which is MacWrite-compatible—and a billing feature.

**The Mac elicits creativity by the very nature of its design.**

As you can see, plenty of interesting and useful products to use with your Macintosh are on the scene. By the time you read this, even more will have materialized. With more than 500 companies currently working on Macintosh products, we'll soon have an abundant wealth of Mac software and hardware. Meanwhile, don't forget to write to us with tips for using the Macintosh. +

Maggie Canon

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# LETTERS TO THE EDITOR

## WHERE THE ANSWERS ARE

**Dear *A+*,**

First let me say that I think *A+* is one of the finest magazines for information regarding the Apple line of computers. I enjoy all of your articles and look foward each month to new and exciting tips, helpful programming advice, and information on new hardware and software products.

I have learned a great deal about my Apple IIe from reading articles in *A+* and other computer magazines. I have found out that once you purchase your system, the salespeople in some of the computer stores seem to lose interest in you.

It seems they are too busy or don't know the answer to questions I have. So, I turn to *A+* for answers, and many times *A+* has the answer to the question I had regarding software or a modem or almost any new product.

So keep up the good work so people like myself, a beginner when it comes to computers, will have somewhere to turn to for some answers.

Michael R. Iacono
Medford, MA

## ALUMINUM TRANSPORT

**Dear *A+*,**

Your article on traveling with an Apple computer omitted what I considered to be an obvious choice. For several years, I have been transporting my Apple II Plus in a pair of Zero-Halliburton aluminum cases. These cases were designed for transporting photographic equipment and contain foam rubber that can be cut to allow insertion of the gear to be moved. Once the case is closed, my computer equipment is fully cushioned by a minimum of one inch of high-density foam on each side.

I use two cases. One contains the Apple plus numeric keypad; the other holds two disk drives, a Silentype printer, and assorted cables and cords and a tool kit. The monitor is handled separately.

I've seen what some computer cases have looked like after being manhandled (conveyor-handled?) and have relied on the Halliburton cases for transporting delicate equipment for some time. They are available through photographic-supply houses.

Bruce Appelbaum
White Plains, NY

## APPLE WRITER AID

**Dear *A+*,**

The Gila Valley Apple Growers Association maintains an AWIIe voice help line for Apple Writer IIe users at (602) 428-4073.

There is no cost for this service, except for the usual phone charges. Best calling times are 8–5 weekdays, Mountain Standard Time.

The group also has an AWIIe toolkit package consisting of eight crammed-full diskette sides. Included are such goodies as patches for NULL, "shortline," and IIc detrashing; answers to hundreds of most-asked helpline questions; microjustify and proportional space, camera-ready secrets; a complete disassembly script; source-code-capturing information; self-prompting glossary secrets; and bunches more.

Individual NULL, "shortline," and "IIc De-Trashing" patches are available free on written or phone help-line request. The association's mailing address is Box 809, Thatcher AZ, 85552.

Don Lancaster
Thatcher, AZ

## WHAT PRICE MAC SOFTWARE?

**Dear *A+*,**

There are many graphics packages for the Apple II family of computers, such as high-resolution character generators, shape editors, drawing and painting utilities that create and manipulate images. Some of these programs are enhanced by supplementary disks such as a disk of fonts. Fontpak from Data Transforms, Typefaces from Beagle Bros., and Additional Typesets from Penguin Graphics are a few examples. These supplementary data disks are priced, on the average, at about $20.

The Macintosh is different from the Apple II line of computers. It contains all the routines you need for generating graphics. MacPaint and MacWrite provide the programs for using these routines. Some software for the Mac, such as the recent crop of clip-art packages, contain no programs—you can't use them unless you have MacPaint.

So what are we being asked to pay $49.95 for? What is an appropriate price for software that requires no programming efforts, no routines, and no innovation?

I recently looked at another new program for the Macintosh, an electronic telephone directory. Instead of using your fingers, you can let your mouse do the walking—for $200.

Currently, the great demand for Macintosh software is sure to send us scurrying to the stores for any new applications for our Macs. Will we get more selective when supply exceeds demand?

Roberta Schwartz
Brooklyn, NY

## CORRECTIONS

**Typing-Instruction Program Name**

In our June and August issues (pages 139 and 96, respectively), we listed a typing-instruction program from Roger Wagner Publishing as Typing Tutor. Typing Tutor is actually a trademark of Kriya Systems, Inc., and Roger Wagner Publishing's typing-instruction program was not yet named at press time.

**Computer Politics**

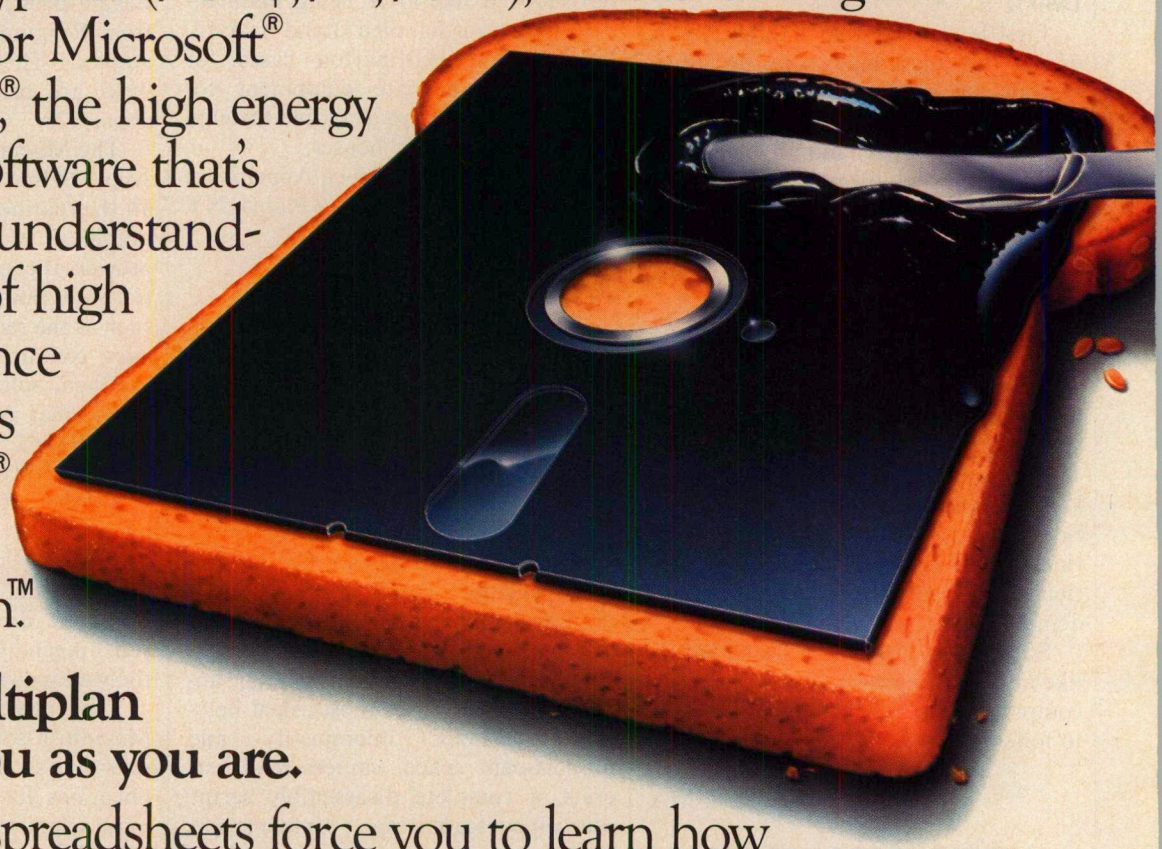
The telephone number for Aristotle Industries on page 13 of our August 1984 issue (under "Computers in Politics") is incorrect. The correct number is (203) 854-5463.

# Don't buy a spreadsheet

A lot of electronic spreadsheets can't cover your needs. They just don't go far enough.

They can't adapt to the way you think. They speak in hieroglyphics (/GF$, /R, /S#S), instead of English.

Time for Microsoft® Multiplan,® the high energy spread. Software that's rich with understanding. Full of high performance capabilities for Apple® II, III or Macintosh.™



**Multiplan loves you as you are.**

Other spreadsheets force you to learn how they think. Multiplan learns how you think. It remembers the way you work. Anticipates frequent commands. Even offers suggestions on spreadsheet set-up.

Multiplan not only uses English commands, it allows you to create formulas in English. Instead of typing mysterious coordinates like H54–L73=BK154, you can simply name worksheet areas: Sales–Costs=Profit.

Multiplan can link data in different spreadsheets. Make a change on one, and every related one is changed.

# that spreads too thin.

And if you have been working with VisiCalc,® Multiplan can read its data files and teach it new tricks. Like how to set up variable column widths and sort data.

## The wish list.

Only Multiplan has optional Multiplan Application Programs that work with you to design and build custom spreadsheets for Budget Analysis or Financial Statement Analysis in minutes. Not hours. Not days.

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Small wonder Microsoft gets more performance out of a spreadsheet. We designed the MS-™DOS operating system that tells the IBM® PC how to think. And our BASIC is the language spoken by nine out of ten microcomputers worldwide.

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# A+ DISPATCHES

## CLEANING THE CEREAL PORT

Isn't it always the little things that trip you and your computer up? The cat hairs in the disk drive, the cable you stumble over at night on your way back from the bathroom, the incomprehensible and ink-smeared labels on your diskettes?

Or maybe you're the picture of efficiency and a veritable model of cleanliness, but your favorite hacker leaves overturned bowls of cereal in the computer room for weeks?

Keeping in mind that Christmas isn't too far away, you may want to dig your way out of your office and buy yourself a computer cleanup kit. It all comes in one package called Computer C.A.R.E., which is billed as "a maintenance and management system for micro and personal computers."

Translation: this kit contains a lot of the tiny accessories you need to clean your computer and keep your files straight.

A Computer C.A.R.E. kit costs $49.95 and includes a head-cleaning kit, a disk-storage system, diskette-index cards, an aerosol air blower, the Basic Quality Bus Buffer (a packaged eraser), diskette labels, diskette write-protect labels, cable ties, self-adhesive cable mounts, a Diskwriter felt-tipped pen, a users' guide and maintenance record, a no-smoking sign, keyboard cleaner and swabs, a CRT cleaner, disposable lint-free wipes, *and* a computer dictionary.

You could assemble these items more cheaply yourself—but it would take time, work, and money you might want to apply to chipping the encrusted Kix from the top of your hard disk. Computer C.A.R.E. is available from Basic Quality Computer Products, 10315 West Jefferson Blvd., Culver City, CA 90230; telephone (213) 837-1881.

If you don't want to get down on your fingertips and knuckles to clean your machine, there's yet another option: Mini-Vac, a miniature hand-held vacuum cleaner that inhales the dust and debris that is clogging your computer's contacts. This version of preventive medicine is available by mail order from Pine-Cone, Inc., P.O. Box 1378, Gilroy, CA 95021. Remember, a clean disk is a happy disk.

CRIS MORTENSEN

## THOSE DARNED COMPUTERS

Computers. You can't live with 'em, and you can't live without 'em. But maybe you'd still like to lean over and give your Apple a good, swift kick. In that case, you might want to investigate two publications that aren't afraid to view computer/human relations with a jaundiced eye.

Computer Cursers of America publishes the bimonthly *@*&!!%# Computers!* (pronounced Expletive Computers), reprinting horror stories of computer woes sent in by members. Club founder Patrick Leonard says that computer addicts "put so much time into the thing that they tend to slip up sometimes . . . They need an outlet for frustration, and that's where we come in." Contact Leonard at P.O. Box 553, Mount Freedom, NJ 07970.

For the truly disaffected, we recommend *Processed World*, "the magazine with a bad attitude." With biting wit, collages of computer ads, cartoons, and scathing articles on the disappointments of the computer age, it's perfect evening reading after a terrible day at the office. Contact its perpetrators at 55 Sutter Street, #829, San Francisco, CA 94104.

## I RAISE TWO BITS

The most unusual participant in the Fifteenth Annual World Series of Poker held last summer at Binion's Horseshoe Hotel and Casino in Las Vegas was an Apple II Plus computer programmed by Mike "The Mad Genius of Poker" Caro.

The World's First Computer Poker Challenge was two winner-take-all freeze-out matches of no-limit Texas hold 'em poker, the same game that annually determines the world's champion poker player.

The computer held its own for 43 minutes against Tom "Grand Rapids" McEvoy, a young former accountant who last year parlayed $100 into the

world championship and $540,00 cash. The Apple went broke after it started a hand with the best two cards but lost when McEvoy's hand improved more than the computer's did.

The contestants used real cards in the challenges, the computer's cards being read by an optical scanner similar to those found at many supermarket checkout stands.

The second challenger was two-time world champion Doyle "Texas Dolly" Brunson, who bet all his chips on the first hand. The computer called and lost, and that match was over in less than one minute. Brunson offered a rematch, and he and the computer traded bets for 50 minutes, at which point they called it a draw, with the computer ahead by 58 chips.

Although the computer lost twice, once in a "bad beat," at least it didn't have any hard-luck stories to tell afterwards.

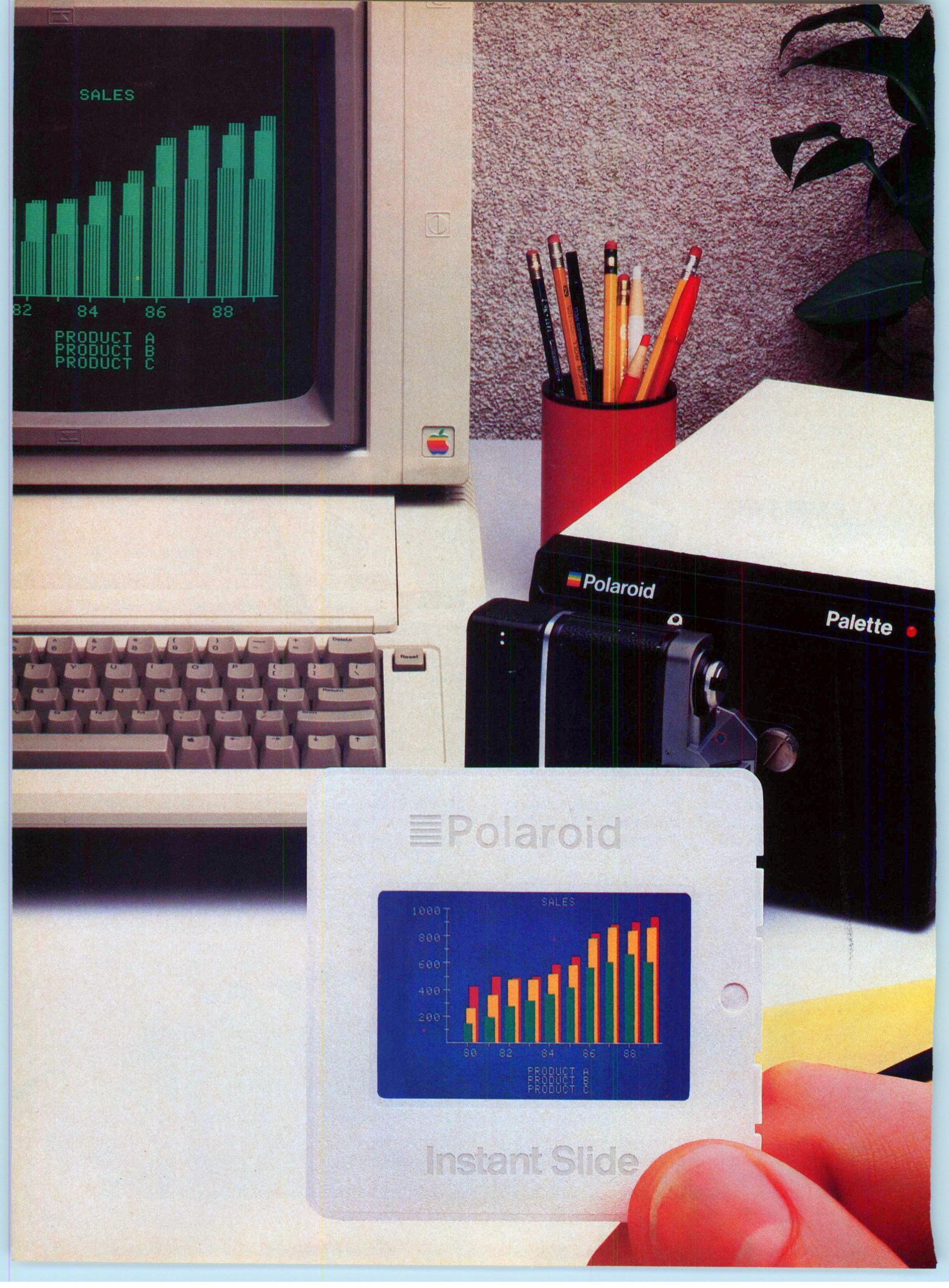
## THE ULTIMATE SPELLING CHECKER

In late-night literary bull sessions when questions come up about a word's spelling or meaning, the final authority is usually the *Oxford English Dictionary—if* you have access to its 13 volumes of specialized terms, word etymology, and quotations.

Now, in an attempt to bring the dictionary into the modern age, the Oxford University Press plans to turn the *OED* into a computerized database.

David Attwooll, the executive editor for reference books at Oxford University Press in New York, says that with the computer version of the *OED*, the dictionary can become not only a lexicon of British English, but "the international dictionary of the English language," with input from the United States, Australia, Canada, and other English-speaking nations from around the world.

The project has already begun, with donations of funds from the British government, funds and a mainframe computer from IBM, and a staff of 120 to complete entering the massive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**Works with the graphics packages of the IBM PC or XT, DEC Rainbow, Apple IIe and II+ as well as other pcs.**

The Polaroid Palette is designed to work with many graphics software packages. In fact, when using such popular programs as Graphwriter, Chart-Master, Sign-Master, DR Draw and DR Graph, Palette can virtually double both the horizontal and vertical resolution of your monitor. Plus, a "backfill" feature reduces raster lines for a smoother, more finished appearance. The result—presentation quality slides. On-the-spot.

**Color 35mm slides, even from a black and white CRT.**

Think of it as an artist's palette. Because Palette "paints" your graphs, charts and text. You're choosing from up to 72 colors. If you don't want red, press a few keys—it's green. And if you're not the artistic-type, Polaroid has developed a menu of color sets: combinations of colors that have been specially coordinated to complement your presentations. And all of this is yours, even if you have a black and white monitor.

**Lets you make last minute changes or add up-to-the-minute information.**

The Polaroid Palette is the fast, convenient, low-cost way to prepare slides for your presentation. And perhaps even more important, Palette allows you to keep confidential information confidential. You won't have to send your work out to anyone again.

So why wait until the last minute to find out about Polaroid Palette? Call this toll-free number or return this coupon. Because with Palette you'll make your deadlines, in no time.

For a demonstration, call toll-free, or mail the coupon to Polaroid Corp., E.I. Marketing, Dept. 604, 575 Technology Sq., Cambridge, MA 02139.

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amounts of data into the data banks.

First on the list, says Attwooll, will be an integrated version of existing *OED* volumes and their four supplements. Within four to five years, we'll be able to read a new version of the dictionary, on paper rather than disk.

Once the data is entered and organized, however, the electronic applications for it are endless, says Attwooll. "A shrewd guess is that it will be on some combination of on-line and optical/laser disk," he said, though no firm plans for distribution have yet been made. Specialized dictionaries and horizontal compilations of word etymologies could also spin off from the project.

Attwooll emphasized that care will be taken to design access to the *OED* so that it won't be machine-specific. Within the next ten years, Apple users will be able to win arguments by showing that *Oxford erat demonstrandum—OED.*

## SO YOU WANT TO BE A SOFTWARE WRITER . . . ?

If you plan to get into the software- or computer-book-publishing industry (and more people think they have a good idea for a computer book than there are broken hearts on Broadway), then psst . . . come over here. I've got a conference I want to tell you about. Keep this data encrypted, though, because there's not much space and it might already be too late.

It's a conference on Computers and Publishing, sponsored by the University of California at San Diego Extension. Judy Parzen, director of liberal arts and sciences at the UCSD Extension, says she started it after hearing from some New York editors that "you care what we do, but we don't care what you do" (*you* meaning West Coast writers, editors, and publishers). She vowed she'd make them eat their words.

This conference is scheduled for November 1–4 at the La Jolla Village Inn in San Diego, and Parzen says she's bringing in computer-publishing professionals, writers, editors, and agents to explain every aspect of the computer-book and software business.

Among those attending will be Tom Bell, vice president of marketing for Micromedia; Richard Gollner, agent and packager; Robyn Hartman, senior editor at Prentice-Hall, Inc.; Nahum Stiskin, president of Microsoft Publishing Group; and Barbara Lowenstein, founder of a major New York literary agency. Acquisitions editors will abound; conference attendees may submit ten pages of manuscript or software design for review prior to the program.

So, if you want to get an inside look at the business—and only a couple of hundred spaces were open, even at $395 a pop—check it out with Jean Forsythe at (619) 452-3422. Don't tell them I sent you—I'll just see you there.

## TALKING TECH IN AMESLAN

Hearing-impaired computer professionals now have a chance to communicate more clearly with their coworkers, using a new standardized sign language of data-processing terminology.

Steven Jamison, a personnel consultant at IBM's Santa Teresa laboratory, began compiling a dictionary of American Sign Language computer terms back in 1981. During the past ten years he's organized annual summer work programs for deaf college students and has realized the confusion surrounding computerese for the deaf when he noticed three or four different signs for the word *computer* alone.

Jamison's 600-term glossary, entitled *Signs for Computing Terminology*, was recently published by the National Association for the Deaf in Silver Spring, Maryland. Although hearing-impaired students and computer workers will no doubt find the manual handy, Jamison thinks data-processing managers and others who want better communication with the deaf may benefit the most.

The ability to hear is not as critical in technically oriented jobs such as programming as it is elsewhere, Jamison said. Nevertheless, the glossary eliminates the need for laboriously finger-spelling many technical terms.

All publishing rights and proceeds from the book have been turned over to the National Association for the Deaf. The book reportedly sold more than 2000 copies during its first month of publication. For more information, contact the National Association for the Deaf, 814 Thayer Avenue, Silver Spring, MD 20910.

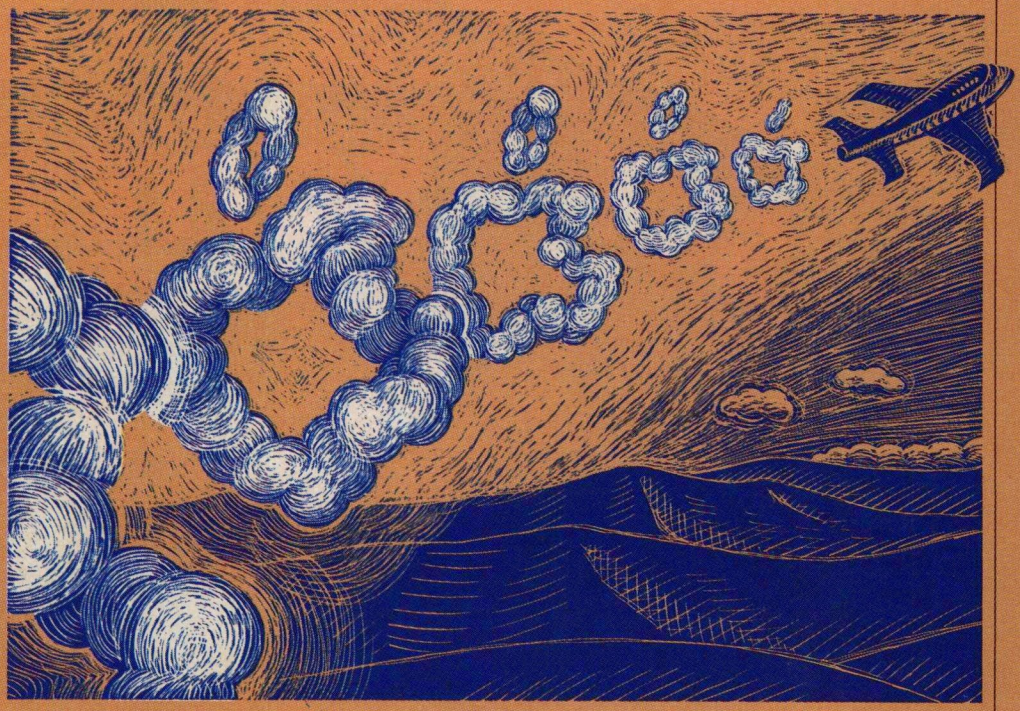
## . . . OFF THE OLD PET ROCK

God help us all, you can start looking for the computer world's answer to the Pet Rock on the shelves of your local stores this summer—CHIP, Your Personal Home Computer.

The manufacturer, Young Enterprises, calls CHIP "user-intimate" and "user-compassionate." With a truly personal-size footprint of only 5 × 6¾ inches, CHIP travels anywhere with you without raising a single eyebrow at the FCC. CHIP buyers receive their very own reproduction of a keyboard and monitor and a genuine integrated circuit for a CPU—the heart of CHIP.

To compute, simply flip your CHIP into the air wherever there's a flat surface for landing—excuse me, I meant *an appropriate computing environment*. If CHIP lands standing up, your answer is Yes; if CHIP lands with legs up in *resting* position, your answer is No.

Don't worry about software compatibility with CHIP. The so-called operating manual defines programs as instructions that tell a computer what to do and when to do it, and "you will find that CHIP considers 'programs' somewhat beneath its dignity. Please address CHIP with polite requests only."



The puns and word play in CHIP's operating manual bring a new meaning to the term *gag gift*. Will it help to mention that CHIP is descended from the CHIPanzee and CHIPped Beef (Black CHIP of the family)? I thought not.

Compounding horror upon horror, Young Enterprises, based in Danville, California, plans a Friend-CHIP Club that requires the CHIPpocratic Oath, CHIP T-shirts, and perhaps even formal adoption papers for your CHIP.

It's never too early to start stuffing those Christmas stockings. Meanwhile, this reporter will write about something more, um, chipper.

## FLY YOUR FRIENDLY APPLE

One person's business requires her to fly out of state every week; another person flies home to visit relatives only once a year. Both fliers share a common goal, however—*cherchez le* cut-rate airfare.

If you still play telephone tag with your travel agent, you may not know that computer users can now get the inside track on ticket prices via data-bank services such as The Official Airline Guides Electronic Edition.

Many travel agencies use computer services that reportedly are programmed to bring up scheduled flights for particular airlines first, said an OAG spokesperson. OAG, a subsidiary of Dun & Bradstreet Corporation, says its independent service can save users between 20 and 50%.

This on-line service entails a $50 one-time installation fee. Thereafter, users are charged 10 cents per minute, 20 cents per schedule screened, and 30 cents per fare. OAG says the average business client spends seven minutes looking up fares.

This service may not come as news to those of you who subscribe to services such as Dialcom, Dow Jones News Retrieval, The Source, or CompuServe. On these and other services, the OAG Electronic Edition is available for an initial premium and billing on an hourly basis. A spokesperson for OAG says that the system is now also available through retail computer stores.

However you use the service, it's one good way to let your fingers do the walking while you do the flying. ✚

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If you have an Apple II, Apple II Plus, or Apple IIe, we have good news for you. Now there are two inexpensive software programs that can turn your Apple into a much more valuable tool.

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**Softerm 2 connects you with your company's computer.**
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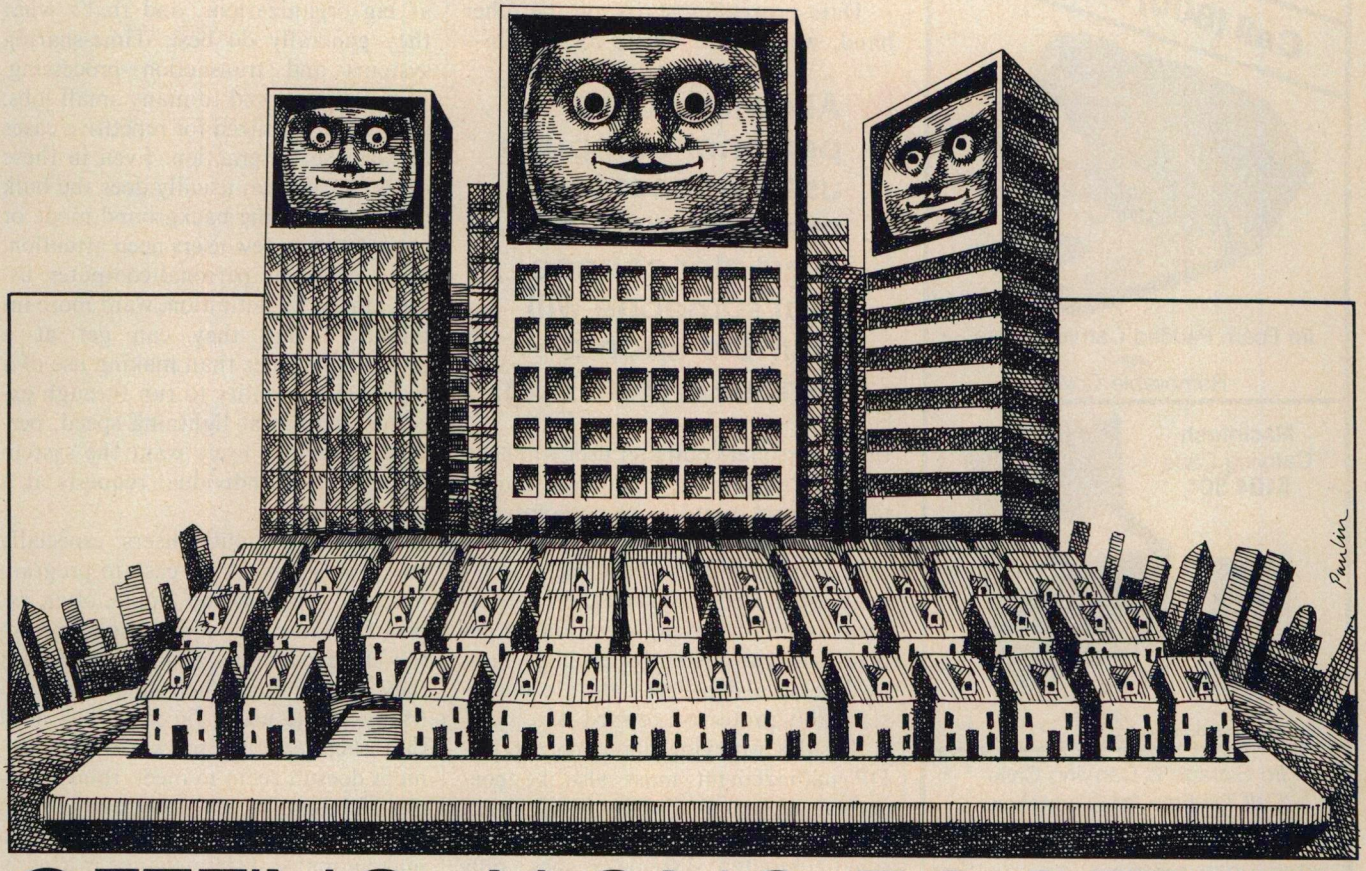


# GETTING ALONG TOGETHER

The social connection between personal-computer users and mainframe data-processing staffs needs more attention, it seems, than the technology of hooking Apples to mainframes. While the requisite hardware and software connections are already in place or in the wings, many computer systems are just beginning to examine the social and organizational issues.

Bringing Apples and other personal computers into large organizations with big computer systems can cause friction between existing data-processing (DP) departments and personal-computer users. These strains are not merely the inevitable clash of new ways replacing the old. Real issues are involved, and there's right on both sides. Both Apples and big computers promise to be around for many years, however, so both sides need to find ways to work constructively together.

Furthermore, as network technology and personal computers continue to advance, an increasing amount of computer use in organizations with mainframe computers will take place locally. "Distributed processing" and other forms of sharing information between mainframe and personal computers promise to give computer users spread throughout an organization better access to information and faster response. The challenge is to keep the flexibility and responsiveness of desktop computers without interfering with the comprehensiveness and accuracy of the information in the mainframes.

**Bringing Apples and other personal computers into large organizations with big computer systems can cause friction.**

**What Users Want**

On the Apple users' side, people want easy access to mainframe data. Personal-computer users who develop an expertise and a set of programs on their own find they need data already collected and available on mainframes. In a corporation, for example, departmental users may want to use financial figures from corporate databases as data in their spreadsheet models. At home, investors want financial information from information utilities. Researchers want statistical data from government databases.

Personal-computer users also want to move data back from their computer to a mainframe. Managers who develop their own departmental budget on a

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personal computer want to be able to send that information directly into the mainframe for use in their company's overall plan, without the expense and the risk of errors in typing it in on a terminal. Salespeople who download information about prospects want to send in the resulting orders directly from their computers.

Data-processing staffs, on the other hand, worry most about corruption—

**Allowing personal-computer users access to a mainframe means a greater chance that someone will stumble upon a serious system bug.**

that a personal-computer user will accidentally or purposely damage important information in a corporate or organizational database. Fighting this kind of corruption is one of the primary goals of a well-run computer department in any large organization. Organizations that have invested huge sums to develop and collect data are understandably protective toward it.

Besides worrying about corruption, DP management must also be concerned about availability, efficiency, and the use of resources. When a personal-computer system crashes, only the user or a few users are directly inconvenienced. When a large organizational system goes down, on the other hand, the direct result is often the idling of dozens or hundreds of users. Software for large computers, especially programs meant for use only by skilled staff members, is not always as goof-resistant as it should be. Allowing personal-computer users access to a mainframe means a greater chance that someone will stumble upon a serious system bug.

Using personal computers to access mainframe systems also ties up ports on the system that might otherwise accommodate dedicated terminals. Although an Apple may be more powerful than most minicomputer or mainframe terminals, it wasn't engineered specifically for an optimum relationship with large systems.

Apples are less expensive than many dedicated terminals—but equipment cost is one of the ways that data-processing departments have limited the number of users who tried to access a system. A proliferation of personal computers emulating terminals can quickly overload the capacity of even a large mainframe system.

Demands by a multitude of personal-computer users can also reduce the efficiency of large computer systems. Big computers are designed for big jobs at big organizations, and that's what they generally do best. Time-sharing systems and transaction processing, seemingly tailored to many small jobs, are really optimized for repetitive cases or fast user interaction. Even in these cases, the system usually does the bulk of its work in the background mode or at night when few users need attention.

In contrast, personal-computer users, almost by definition, want more interaction than they can get at a terminal. Rather than making use of a big system's ability to run through existing routines at lightning speed, personal-computer users want the system to respond to individual requests at a human pace.

Personal-computer users, especially those accustomed to easy-to-program machines such as the Apple, often expect the same individual response from the DP department and its machine as they receive from their small systems. Many Apple users, faced with a need that their existing software or equipment doesn't seem to meet, think nothing of buying a new program or even writing their own. The time you need to make a major system change is usually measured in hours or days.

Big machines don't provide that kind

**A proliferation of personal computers emulating terminals can quickly overload the capacity of even a large mainframe system.**

of flexibility. Making even the smallest change in the software for a corporate mainframe may require a preliminary study, a project budget, international cooperation, and the cooptation of one or more full-time staff members. Even when the various applications and databases on big machines are not inextricably intertwined, the close linkage between the programs and a necessarily complex operating system can prevent

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*Fall/Winter 1984*

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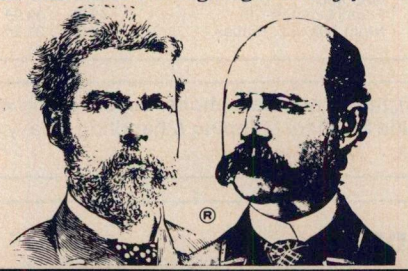

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all but full-time experts from making significant changes.

**Setting a Standard**

Despite these problems, most DP departments and personal-computer users eventually see the logic of working together. Rather than ignoring personal computers completely, most mainframe administrators are now looking for ways to accommodate the burgeoning number of personal-computer users.

As an immediate solution, some "big iron shops" (as the DP departments for large systems are termed) have decided that the best way to treat personal computers is as if they were a special class of terminals. You'll find that most information utilities (such as The Source or CompuServe), for example, rarely provide ways to use a personal computer as more than a terminal. Many private systems act the same way.

Because big systems do best by repeating large numbers of similar transactions, many mainframe and even minicomputer systems have tried to promulgate a single standard for personal-computer use within an organization and then to adapt the mainframe to provide a clearly defined class of service. Over the past year or two, it seemed possible that the IBM Personal Computer would be the sole system to win the DP department imprimatur at most corporations, but the increasing interest in the Macintosh and the counterattack from other goliaths such as AT&T may yet hold off that hegemony.

In the long term, however, most experts predict that some form of network will provide a better matching of the strengths of personal computers and large central systems.

**Most DP departments and personal-computer users eventually see the logic of working together.**

One approach is to distribute databases across a network. Some firms already sell software to let big machines accept data from VisiCalc and similar spreadsheet models. A corporate mainframe can thus keep the overall organizational budget, while individual departments hold on to the details that affect only their own area.

Distributed-database technology is still relatively new, so various proposals abound on how to make sure that information at one end of the network reflects any changes made at the other, who takes responsibility for entering what information, and how to make sure only the proper people have reading access or the right to change selected information.

Distributed control, which lets networked systems actually forward requests and instructions to other connected computers, presents even thornier issues. Again, the field is relatively new, so many of the issues are somewhat in flux. Generally, the challenge will be to allow users of Apples or other computers to get services from the mainframe that big machines can do more efficiently while keeping unauthorized users from seizing too much control of resources or accidentally interfering with other users.

**What Is Possible Today**

Until organizational redefinition and system evolution to distributed processing take place, Apple users can still connect to mainframes in more traditional ways. Using various combinations of hardware and software, you can make an Apple or other personal computer look to a mainframe like one of its own. For example, Apple offers termi-


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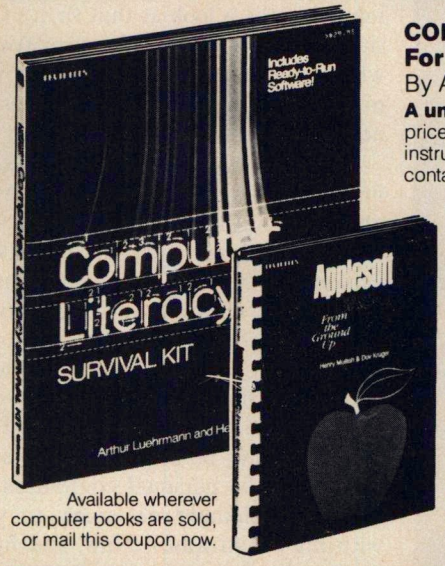


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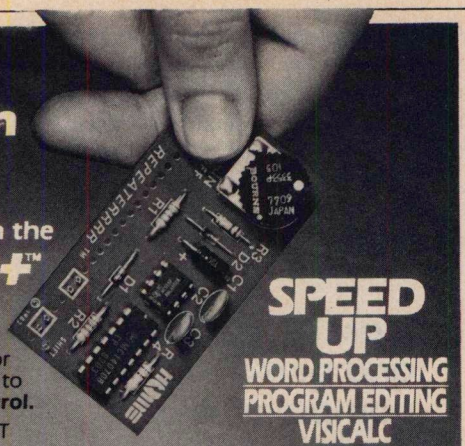

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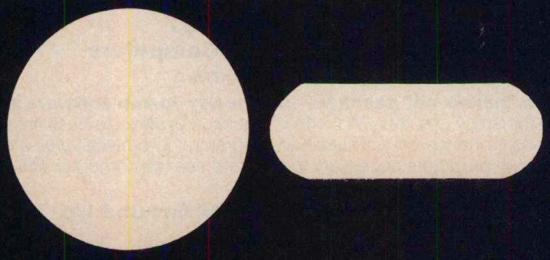

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nal-emulation software for most of its computers that turn an Apple machine into a DEC VT100 terminal look-alike for connection to minicomputers and dial-up networks. With this software, mainframe programs that expect to communicate with this kind of terminal can use cursor-positioning commands and screen editing to build complex text screens rapidly. In contrast, simple communications packages often support nothing more than TTY (short for Teletype) connections, where the terminal is assumed to know only how to display characters and move down to the next line.

For hooking up to big IBM computers, Apple and others will sell you a protocol converter or even a complete cluster controller (see page 57 in this issue). The IBM mainframe world uses different cables, connection methods, and even character codes, so this additional hardware is vital for making an Apple fit in.

Adapting to mainframe hardware and communications protocols is as far as the Apple or other personal computers can go, however. With the right software, an Apple can send prewritten text to a mainframe or capture the data that comes back down the line. To download and upload nontextual files from the mainframe to the Apple or to add error-checking during transmission, some changes are necessary at the mainframe end. In particular, the mainframe needs software that tells it how to exchange files with personal computers. First Concept Technologies is a company that provides this type of mainframe software. On page 39 of this issue we take a look at that firm's Continuum series of mainframe software, which allows Apples to interact with mainframes in a distributed-processing network.

The coming months should also see important announcements from Apple about its Applebus network and from IBM about how it expects to network personal computers and big machines. With these reference points, software developers should begin to turn out a wide variety of packages for Apple-to-mainframe links.

Given the proven adaptability of Apples and other personal computers, it's clear that the personal computers can make the changes necessary to work with big mainframes. Now, and in the future, the real innovations must come from computer designers and users. After all, interfacing is far too important to be left to machines. +

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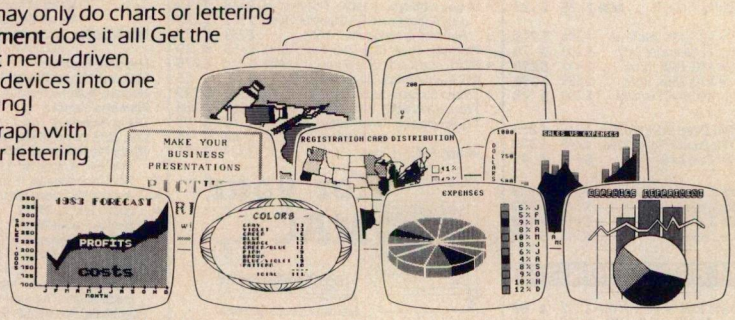


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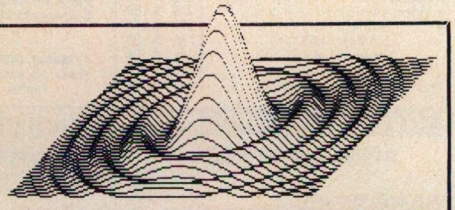

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# APPLES AND MAINFRAMES

**▶ APPLEWORDS**
**BY STEVE ROSENTHAL**

## A short glossary

**COAX, OR COAXIAL CABLE**
A type of communications cable used in networks and for connecting terminals to mainframe computers. When an Apple is hooked up to a mainframe through a protocol converter, the converter hooks up to the controller with coax cable. Coax is more expensive than the telephone-style cable often used for hooking up personal computers, but it can carry data at higher rates and is more resistant to electrical interference. Physically, coax is round, with a center conductor surrounded by an outer braid or foil.

**CORRUPT**
To damage the data in a database, intentionally or accidentally. One of the main reasons that data-processing managers responsible for large computers want to limit access by personal-computer users is that they are afraid that users will corrupt vital databases.

**DOWNLOAD**
To send a file from a large or remote computer to a small or local one. Downloading requires some way to synchronize the sending of the file by one system with the receiving and storing of the data by the other. Although you can often send text files with simple software, exchanging programs and numeric data requires more complex error-checking methods. Currently, software is available for all models of Apple computers to download data from bulletin boards and other personal computers. Software that allows Apples connected to IBM mainframes to download mainframe data, using protocol converters, should become available in the coming months.

**EBCDIC**
An acronym (pronounced ip-sa-dik) for extended binary-coded decimal interchange code. It is the code that IBM uses for representing characters and control values on its large computers. The EBCDIC uses the 256 possible 8-bit patterns to represent a selection of graphic (printing) and nongraphic (control) codes.

Although the code values are different, both ASCII and EBCDIC have mostly the same graphic (printing) characters, so it is relatively easy to translate from one to the other for simple text. Many of the control codes are different, however.

**EMULATION**
One computer acting like another computer or terminal.

**HOT KEY**
On an Apple computer set up to connect to a mainframe computer, a key that lets you switch between the Apple's function as a local terminal of the large computer and its role as a personal computer. Some, but not all, mainframe communications packages provide this capability, usually as a software-command sequence.

**LOCAL**
In reference to connections between large computers and their terminals and controllers, this term means connected directly by wire rather than via a communications link and modem. This mode is also called Channel-Attached.

**MAINFRAME**
A large computer of the type used by businesses, governments, and other large organizations. These computers actually may be less costly per unit of work done than personal computers, but mainframes also are less flexible and require a whole supporting bureaucracy.

**PROTOCOL**
A set of rules governing the way information is exchanged over a computer network. Personal-computer data networks generally use simple protocols meant originally for teletypewriters, a public-domain protocol called XMODEM, or various protocols included in proprietary software packages.

Large computers use more complex protocols, the best known of which are IBM's BSC and SDLC. Although they are directly incompatible with mainframes, personal computers can be hooked up to large computers with protocol-converter units.

**PROTOCOL CONVERTER**
A box that connects between an Apple computer and a mainframe computer that expects to communicate with an IBM 3270-series terminal. The Apple runs software that makes it emulate a terminal (such as MacTerminal or Access 3270), and the protocol converter translates between the emulated terminal and the special requirements of the 3270 series.

The converter matches the asynchronous protocol the Apple uses with the BSC or SDLC protocol the 3270 uses. It also translates between the EBCDIC character code used by the mainframe and the ASCII code used by the Apple, buffers between the mainframe's polled page-at-a-time method and the Apple's asynchronous character-by-character method, converts the cursor-positioning commands for the mainframe terminal to the form understood by the Apple communications program, and translates sequences of keys.

**REMOTE**
In reference to controllers for data-communications networks, one that connects to its host mainframe via a

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modem or other data link (as opposed to local controllers, which are wired directly to the mainframe).

**SDLC**

An abbreviation for Synchronous Data Link Control, a communications protocol used by large IBM computers, especially in networks based on their SNA (Systems Network Architecture) arrangement. Apples can link up to these networks through protocol converters or the Apple cluster controller. These units communicate with the normal Apple asynchronous method on the Apple side and the SDLC method on the mainframe side.

**SNA**

The abbreviation for Systems Network Architecture, an IBM system of data communication for large computers. When an Apple computer is connected to a mainframe by a protocol converter or Apple's cluster controller, the converter or controller follows the SNA scheme, using the SDLC protocol (or the older BSC protocol for some models) for communication. Systems Network Architecture is a complex layered set of rules that govern error checking, addressing, synchronization, and many other communications chores.

**UPLOAD**

To send a file from a smaller computer or local one to a larger or remote computer. Uploading depends on both the computer at the sending end knowing what to send and how to format the material and the system at the receiving end knowing how to receive and store away the data. So far, popular file-transfer software for the Apple family lets you upload data to bulletin boards or other personal computers. Only a few programs for use with Appleline or similar methods for connecting Apples to IBM mainframes currently allow uploading from the Apple to the mainframe, but more programs in the next round of software products should add this capability.

**VT-100**

A trademark of Digital Equipment Corporation for one of its terminals. This model is one of the most popular of all terminals for asynchronous connections, and consequently it is the terminal that most communications packages for the Apple simulate to allow the Apple to connect to larger computers and communications networks. Appleline and other Apple products for connecting Apples to IBM mainframes that expect the Apple to run terminal-emulation software assume VT-100 emulation at the Apple end (as do the products of most independent vendors). +

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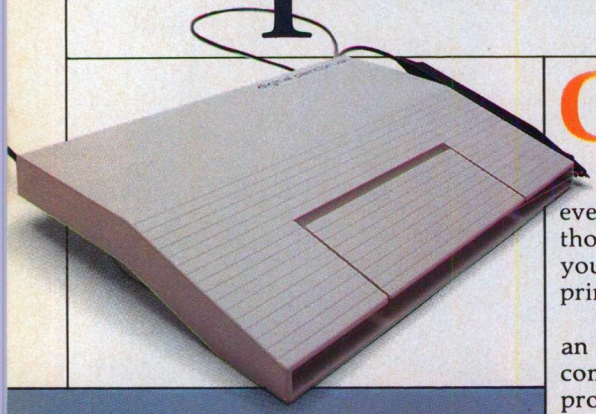

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Our system lets you take an idea, draw it on the screen, manipulate the image electronically — even draw interactively with a colleague thousands of miles away — then save your concept on disk or dot matrix printer.

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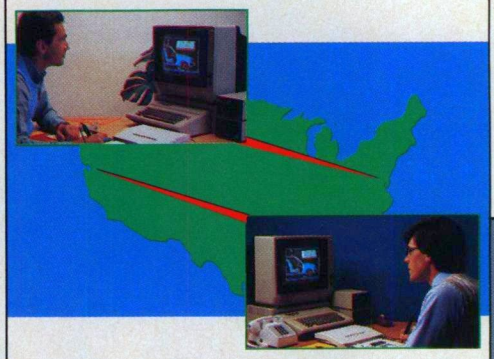
## Draw interactively. Coast-to-coast.



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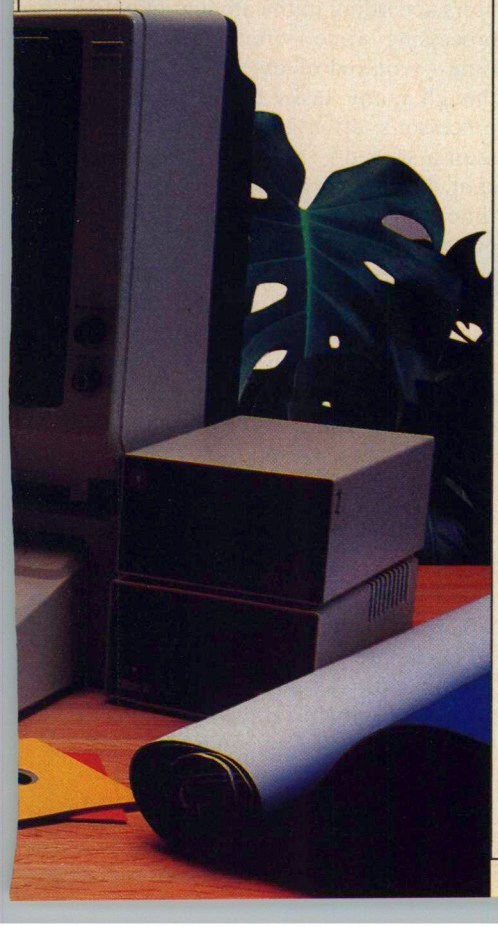

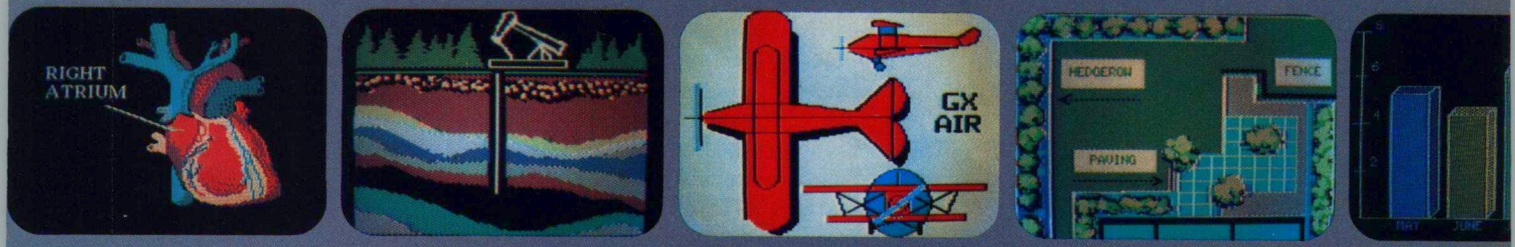


All images were created on The Digital Paintbrush System™ with an Apple IIe and II+.

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part one

## ▸ LINKING APPLES TO MAINFRAMES

BY W. CHARLES DOHERTY

# The Best of Two Worlds

What can a mainframe do that an Apple can't? Equipped with two standard floppy-disk drives, an Apple II-series computer provides approximately 280K of on-line storage; a single-drive Macintosh gives you about 400K. Although this amount of storage may be fine for many applications, it can sometimes be a severe limitation. One way to get around the problem of insufficient storage is to hook your Apple up to a mainframe computer.

According to Paul Sanroma, a software-engineering consultant in Bristol, Rhode Island, even the smallest mainframes offer storage capacity and computing power far beyond the range of the most exotic micros. Says Sanroma, "It's not uncommon for a modern mainframe system to have from 1 to 5 megabytes of memory in the CPU alone, with 200 to 400 megabytes of on-line disk storage. Many of the larger systems even go into the gigabyte [billions of bytes] range."

In addition to providing ample storage space, mainframes have very fast processors that allow access to programs with processing power that no micro can match.

On the other side of the coin, an Apple computer can perform some tasks more efficiently than a larger system can. When it comes to throwing together a quick letter, a microcomputer can't be beat. Mainframes also lack the personal touch that popular microcomputer spreadsheet programs provide. An Apple devotes all of its attention to a single user.

"If you have ever operated some of the system programming facilities on mainframes, you certainly won't want to do it again," asserts Rick Geiger, manager of Advanced Developments at Apple Computer, Inc., and a specialist in the field of mainframe-to-micro communications. "Those mainframes can be very difficult to use at times, especially when you are competing with many other people for the processor's attention," he adds.

During periods of heavy activity, hundreds of users may be connected to one mainframe computer. This situation often results in delays as long as 15 or 20 seconds before the machine responds to your commands. In a business setting, this extra time quickly adds up and results in poor productivity.

A more serious situation arises if a mainframe goes down completely—not an uncommon occurrence. Every user of that system is left out in the cold, unable to do the simplest task. Again, productivity suffers, sometimes with devastating results to a business that depends on computing. Relying solely on a mainframe can be like putting all your eggs in one basket.

A personal computer, on the other hand, devotes all of its computing power to you, and can respond almost instantaneously. In fact, mainframes spend a great deal of their time doing tasks that personal computers can do more efficiently. Freeing a mainframe from this burden results not only in faster response but also in a much more economical approach in the long run. Data-processing managers envision an expanding role for microcomputers alongside mainframes, both as stand-alone processors and as data-entry terminals.

Aside from the significant disparity in the hardware costs of mainframes and personal computers (many full-blown mainframe systems cost well over a million dollars), operational time alone can be prohibitively expensive on a mainframe. Most systems bill their users according to the amount of actual processing time—often called CPU time—required of the mainframe. Although many tasks take little of the processor's attention—sometimes less than a second—the cost is still significant. In some larger systems, processor time can be as costly as $300 to $400 per *minute*.

To operate any data-processing system efficiently, you first have to take a careful survey of your needs. The needs analysis will help you understand what tasks need to be done and how much computer power is necessary for each task. In some cases, microcomputers can do much of the work currently assigned to mainframes. By delegating certain tasks to smaller machines, a system operator can keep the "heavy artillery" free for the work it does best.

**A Happy Medium**

Fortunately, you can have the best of both worlds: the high speed and mass storage of a mainframe, along with the convenience and economy of an Apple. Recent developments in hardware and software enable Apples to link with

larger systems to share both data and processing power.

Even if your business does not have an in-house mainframe, you can still use one of these large computers. Most metropolitan areas have several data-processing facilities that make their equipment available to outside users. Charges vary from system to system and are based on the amount of storage you use, the length of time you are connected to the system, and the actual CPU time.

Anyone who stores or requires access to large amounts of data will appreciate an arrangement of this type. For example, if you use an Apple to handle the records of your retail store, you may find that the system lacks the mass storage you need to deal with a 50,000-name mailing list. Renting space and time on a mainframe gives you a convenient, secure place to store this data, as well as an easy way to add or delete names.

What's more, most mainframe systems include high-speed printing facilities. Printing 50,000 mailing labels may be quite an ordeal for a micro-size printer, but larger machines can do the job easily. Many data-processing facilities will do the printing for you, for an additional fee, and deliver the results.

Connecting to a large system also gives you access to huge pools of information in various specialized fields. The computer system of a large insurance company, for example, may store statistical data on thousands of clients—data that an agent in the field

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may need in order to design a customized policy. By linking a personal computer with the firm's larger system, the agent can access the necessary information. Just as easily, the agent can send data, such as a daily or weekly report, *to* the company's machine.

Rather than placing an extra burden on a mainframe, using a microcomputer actually lessens that system's work load and results in better performance all around by distributing some of the processing work load to the microcomputer. Also, adding a micro is not much more expensive than adding an additional terminal, and the investment often pays for itself with the reduction in operating expenses.

**Making the Connection**

Until recently, mainframes and micros have lived in two separate worlds. The data-transfer techniques most large systems use are completely alien to those microcomputers employ. What's more, mainframes move data at a rate far faster than what most microcomputers will ever be able to read. In order to transfer information successfully, you need both hardware and software.

Apple Computer produces a series of products designed for this purpose. The Apple Protocol Converter and Appleline are hardware devices that let you use Apple products with several popular mainframes. Both convert the mainframes' data-transfer protocol into a form that the smaller machines can understand, letting data flow easily between the two. Apple has also introduced the required software: Access, for the Apple II and III series, and Lisa/MacTerminal, for the company's 32-bit machines.

If a mainframe is located in the same building as your Apple and you can reach it with direct wiring, connecting the equipment is easy. Add the proper protocol converter, run the cables, and you are ready to go. This method of "local operation" is popular among executives who use personal computers in their offices and have a mainframe nearby.

If the two machines are too far apart for local operation, you transfer data back and forth over telephone lines. In addition to the protocol converter and software, this method also requires two modems, one at the micro and the other at the mainframe.

Recently, a third technique has gained popularity. In this system, data is sent to the mainframe on a storage medium, namely magnetic tape. Most mainframe computers use nine-inch, half-track tape for data storage and retrieval. Hardware devices are now available that allow a microcomputer or a group of microcomputers to store data directly on such tape. When the job is ready, you load the tape onto the mainframe, which reads in the data and processes it. Data-transfer speed from magnetic tape is hundreds of times faster than the speed of telephone-line transmission.

Several hardware manufacturers have promised micro-to-mainframe technology, but Apple is one of the few that has actually delivered.

You don't need a modem or protocol converter, and the storage capacity of the tapes is so great (20 megabytes or more per tape) that a week's worth of work often fits on a single reel.

**Operation Modes**

Mainframes and microcomputers can interact in several different ways. One popular approach is to use the microcomputer as a "dumb" terminal. With this arrangement, the micro does little actual processing; its main function is to emulate one of the terminals the host computer uses. This type of mainframe/micro link subjects you to many of the drawbacks of larger systems, long response time and high cost being the most serious. An advantage of this arrangement is that a microcomputer, unlike a terminal, has a disk drive for storing data.

A more efficient method is to use a technique called distributed processing. The micro serves as a complete, standalone computer—sometimes called a front-end processor—with all of its power available to the operator. You enter and process data on the smaller unit until you're ready to "upload" it to the mainframe.

The reverse is also true: You can download data from the mainframe and process it on the micro. This strategy is particularly helpful when it comes to analyzing or updating small sections of a file—a job that a microcomputer can handle with ease.

By doing a large share of the processing on the micro, you have to use the mainframe only for brief periods. Most work takes place while the two systems are disconnected. This approach insulates you from the mainframe's long response time and wastes less of that system's premium-priced CPU- and connect-time.

Distributed processing also makes life easier for other mainframe users. Since you are not vying for such a large share of the processor's time, you won't have as detrimental an effect on other people's operations. More users can operate from the same mainframe than would be able to, otherwise. A machine that would be taxed to its limits with 200 standard users can, with the help of distributed processing, often operate efficiently with many times that number.

Using microcomputers in a local-area network and transferring data via magnetic tape is the most cost-effective way of using mainframe facilities. Being passive from the mainframe's perspective, the micros are available for use at any time, regardless of the mainframe's current work load. The technique allows finished data to run through the mainframe in a "batch" mode, a less expensive approach than doing the job interactively. What's more, tapes can be batch-processed when the mainframe is the least active, often late at night, resulting in further savings.

Tape transfer does have its limitations. Since you have to move data from computer to computer physically, you can't interact with the mainframe in "real time." Rush jobs must wait until someone can transfer and load the tape. This system is best suited to tasks such as high-volume data entry, for which time is of less importance.

Both distributed-processing and tape-transfer systems can operate independently of the mainframe. Even if the larger system goes down altogether, you can still work on your microcomputer.

Several hardware manufacturers have promised micro-to-mainframe technology, but Apple is one of the few that has actually delivered. For this reason, many management-information-systems (MIS) managers have already adopted Apple computers in distributed-processing networks and as remote data-entry terminals. They have found that, in many cases, microcomputers are a logical choice over traditional mainframe-access methods. The final result is a system that is more powerful than the sum of its parts. ✚

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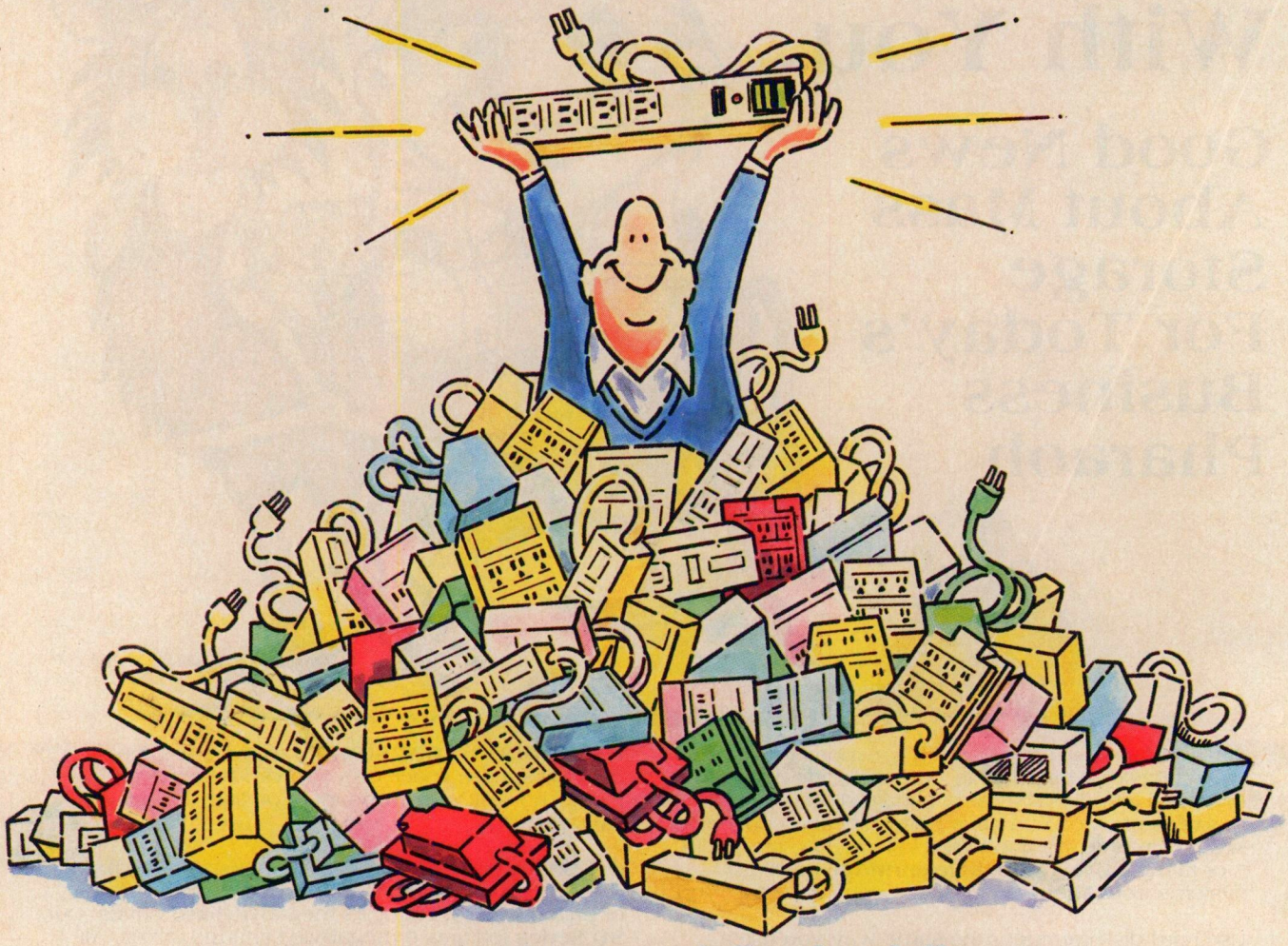

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By now, just about everybody knows that computers need protection from data-destroying electrical surges and spikes.

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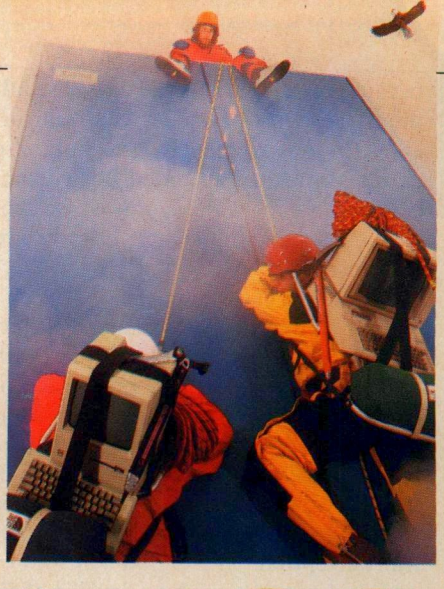
part two

**▶ LINKING APPLES TO MAINFRAMES**

BY FREDERIC E. DAVIS AND RUTH RAMBERG



# Mainframe Software for Distributed Data Processing: Continuum

First Concept, of Rochester, New York, an innovative mainframe-software company, is developing a series of mainframe-software products called Continuum. The Continuum series allows most major mainframes to share distributed data processing with Apples and other microcomputers.

First Concept has already released three products in the Continuum series that permit Apples to make extensive use of mainframe resources: Interchange/1, Library/1, and Courier/1. With Interchange/1, the most significant of these software packages, Apple-based application programs can access and update records contained in virtually any mainframe database. The ability of this product to work with almost any database or DBMS (database-management system) is one of its most impressive features. Because Interchange/1 is designed to be totally "transparent" to the Apple, users receive the impression that the mainframe database is resident in the Apple.

Library/1, a utility program for use in conjunction with Interchange/1, provides file-management services on the mainframe for Apple users.

Courier/1 is an electronic-mail program for Apples and other microcomputers and terminals that are using the mainframe.

**Interchange/1**

Interchange/1 provides Apple users with record-level access to mainframe data and affords database integrity by strictly controlling the Apple's interaction with the mainframe. Various levels of password protection insure data security. The product also includes excellent facilities for uploading and downloading information. Without any specific knowledge of the mainframe DBMS in use, and without utilizing any microcomputer disk storage, you can program any Apple to treat mainframe data as if it were resident on the microcomputer.

Interchange/1 automatically accepts data-manipulation commands the Apple issues and dynamically translates them into the appropriate mainframe DBMS function, based on the DBMS in use. From a single application program, users can issue calls to an unlimited number of mainframe databases resident on any number of database-management systems. A single application program on the Apple, for example, could be simultaneously accessing two TOTAL files, an IDMS file, two ADABAS files, and a VSAM file. The database commands the Apple uses—Get, Insert, Update, Delete, and so on—remain the same, even though different database-management systems are being used.

**Uploading Information**

The Interchange/1 Upload utility allows users to transfer data from Apple files into the mainframe database or use the keyboard for direct input. To insure database integrity, the mainframe checks data to validate the fields the Apple is transferring, prior to uploading each record into the DBMS, whenever the database administrator (the person in charge of the database, who is usually located in the computer center that houses the mainframe) has specified particular access criteria for a field. Data checking occurs only when access criteria are specified. Errors and other data exceptions will cause the mainframe to bypass the update record and send a corresponding error message to the Apple.

Upload enables users uploading records from the Apple to establish search criteria for their validation and selection. Interchange/1 uploads only records that meet these search criteria, allowing partial upload of microcomputer files. As a result, Upload serves as a simple data-entry utility, with data validation by range, type, and so on.

**Downloading Information**

You can transfer data from a mainframe database directly to an Apple file, the screen, and/or a printer using the Interchange/1 Download utility. Here, too, users can specify search criteria to select records to be downloaded, and Interchange/1 will download only those records that meet the search criteria, allowing partial download of mainframe DBMS files.

Download can also serve as a simple query/report utility, with user-defined record selection and user-defined display and printer formats. Users select the records to be downloaded, indicate the destination (screen, printer, and/or file), and choose the download format (the layout for the screen or printer and the file type and record layout for the file).

Full mainframe security prevails,

because only the fields the database administrator has defined are downloadable to the Apple. If the database administrator has specified Boolean access criteria for a field, only those records that meet the search criteria are transferred.

**BASIC and Pascal Support**

First Concept has designed Interchange/1 for use in conjunction with various application programs and programming languages. For off-the-shelf application software, it supports the DIF (data-interchange format) file-transfer option. Many popular Apple software products offer the DIF file-transfer option.

For users who wish to develop their own custom Apple software, Interchange/1 supports both BASIC and Pascal. It allows your custom programs to use simple commands such as Get, Insert, Update, or Delete to access the mainframe database. Interchange/1 places the information retrieved from the mainframe into user-declared template fields that vary according to the programming language you are using. The support for both BASIC and Pascal is impressive. To each of the languages, Interchange/1 adds about a dozen new commands that allow the Apple to make extensive use of mainframe databases.

**Mainframe Security**

Hooking Apples or other micros up to mainframes raises the serious problem of keeping the mainframe database from becoming damaged. Interchange/1 provides complete mainframe security by allowing the database administrator at the central computer center to specify which fields in any record an Apple can access and the passwords for each type of access.

The database administrator can specify a template for each file to be accessed by microcomputer users. Using the Interactive Template Utility program that Interchange/1 provides for this purpose, the database administrator defines the files and fields that the microcomputers are to access. (Although the database administrator can create one or more templates for each file to be accessed, each template can include fields from only one DBMS file.) Apple users, specifying only the name of one template, can simultaneously access multiple templates that the database administrator has linked to the original template. The database administrator uses a system-maintenance password to enter the Interactive Template Utility. This password prevents unauthorized personnel from accessing the utility.

**First Concept's Continuum series is one of the most powerful ways to use Apples with mainframes in a distributed-data-processing network.**

During the next step in the setup procedure, the database administrator specifies the name of the file to be accessed. The utility then asks for the field names of each field that the Apples are allowed to access. If the database administrator has not specified a particular field, the Apples cannot access it. The database administrator gives a descriptive name to each field he selects. The Apples then use this name in their programs when referring to that field. When the database administrator has specified all fields, the utility asks for the type of file access permitted the Apples. At this point, the database administrator supplies a specific password for each level of access. Interchange/1 subsequently uses the passwords that users give to determine what level of access they are allowed.

When the database administrator has completed the template definition, Interchange/1 stores it in the mainframe database. Subsequent changes do not require the creation of a new template; users can add or delete fields, change passwords, and upgrade or downgrade file access by simply modifying the existing template.

**Mainframe Environments**

Interchange/1 is very versatile and can run on virtually any mainframe that supports asynchronous or synchronous communication. The mainframe can be an IBM mainframe, a plug-compatible, or a mainframe or minicomputer made by other manufacturers. Contact First Concept to determine whether your mainframe can support Interchange/1.

Any file system supported by the mainframe can constitute a DBMS, providing it is accessible to a mainframe computer program capable of telecommunications.

**Library/1**

Library/1 is a utility program that provides complete mainframe library-management services for Apple users. It facilitates the creation of mainframe-based public or private libraries and makes them accessible by a password to all users of a remote network. Apple users can store files, programs, and documents in their library, thus freeing local storage on the Apple and making the library entries available to any other user on the distributed system.

Library/1 supports document and program transfer, as well as document and file browsing. Apple users, even if they lack mainframe-programming knowledge, can transfer files in any format into a remote library for distribution or retrieval. The Apples using the system have available full directory capabilities for their private libraries and for those public libraries to which they have access. Users can assign additional passwords and access levels at the document/file level. Data-center allocation and assignment of libraries maintain mainframe security. To guarantee private-library security, users assign passwords and access levels when they create the library entry.

**Courier/1**

Through Courier/1, complete electronic message facilities are available to users of Apples and other microcomputers or terminals in a distributed-processing mainframe network. Users without any special knowledge of the system can log on from their Apple or any other supported device and transmit and receive mail.

When you ask to transmit a message, Courier/1 automatically prompts for distribution information, and, if you are uncertain about whom you want the message distributed to, Courier/1 will supply you with a complete list of all of its users. You can then select a group of individuals for distribution or optionally enter the names of users you want to send the message to. If you enter the name of an individual who is not currently logged on, Courier/1 automatically stores the message for later forwarding and retrieval.

As a user of Courier/1, you can browse through your messages, respond to some, store others for later review, delete upon reading, bypass, and even delete without reading.

**Service and Maintenance**

First Concept provides 24-hour, 7-day-a-week telephone support for all of its products. To restore your system to fully operational levels, First Concept

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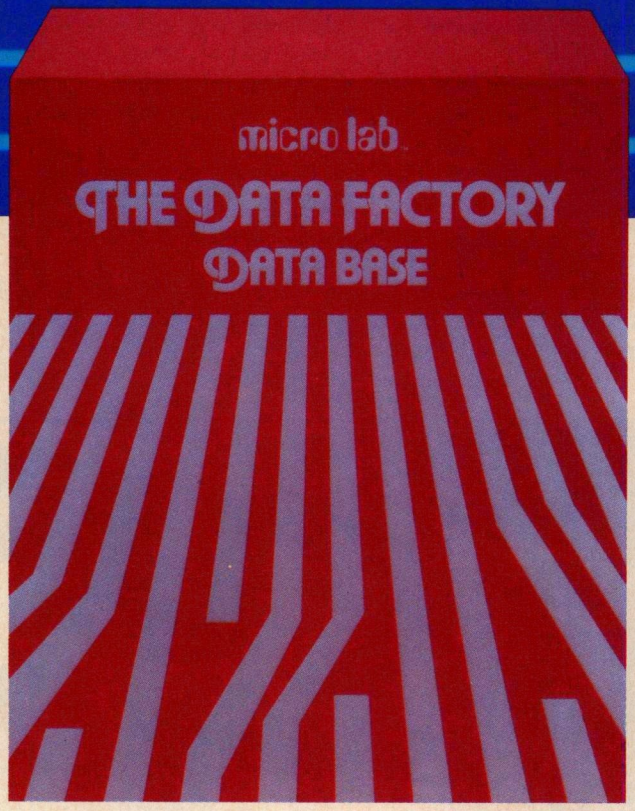


## It's Easy

The Data Factory has easy-to-follow, illustrated instructions. Within the hour you can be setting up your own files. Quickly search through your records for any specific file you want. Easily sort them alphabetically... numerically... or by date. Then you can print out the information in any sequence you need. And, only The Data Factory will do all this for you so fast, so easily and with so much flexibility.

Truly, the finest introduction to electronic data management you can find.

## It's Powerful

As your needs expand you'll find that The Data Factory is a fast, powerful program that can easily handle the most complex data management demands.

It searches up to 88 levels simultaneously. Sorts thousands of records in just seconds. Performs mathematical functions. Offers AND, OR, =, <, >, <>, and date selection criteria. Customizes printouts to any format. And, The Data Factory lets you add, delete or restructure fields without any time consuming data re-entry.

It's the only data base you'll ever need!

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guarantees to have technical personnel on your site within 24 hours for software failure and within 4 hours for hardware failure—anywhere in the world.

Technical-support staff at First Concept's corporate headquarters handle all telephone support. All technical-support personnel have access to the source code and, when necessary, the circuit diagrams for the products they support. The original system designers prepare the necessary plans to fix any system. Thus, First Concept identifies the problem and dispatches personnel with the skills and information necessary to resolve it. Should the support staff lack the necessary information to identify the problem, senior R&D and design staff go to the site. This level of support is unprecedented in the microcomputer industry.

**Education**

Recognizing the complexity of the tasks involved in setting up a powerful distributed-data-processing network, First Concept offers a variety of training courses, which are held either at your company or at First Concept's Technical Support Center in Rochester, New York. These training courses include:

- **The Interchange/1 System**—a half-day overview of the Interchange/1 System and its effective use by Apples and other microcomputers. Emphasis is on the design of generic programs using mainframe data and the requirements for use of the Interchange/1 product in the design of application systems.
- **Interchange/1 for the Sophisticated User**—a one-day course that emphasizes the use of special commands and the direct manipulation of the mainframe database by microcomputer programs using Interchange/1.
- **Database Concepts**—a half-day seminar on the concepts of mainframe database-management systems.
- **Mainframe Database Management Systems for Microcomputer Users**—a one-day course to acquaint users of Apples and other microcomputers with the general concepts of database-management systems. First Concept tailors this course to the database-management system(s) in use at your company and designs it primarily for users of Interchange/1.
- **Database Design**—a one-day seminar in generic database-design concepts. When given at your company, it focuses on the DBMS in use there.
- **Telecommunications Concepts**—a half-day seminar that provides you with an introduction to telecommunications networks, techniques, and the methodology of modems, multiplexers, and other communications devices. The course emphasizes real-world problems and the reduction of telecommunications costs through effective network design.

**Power and Flexibility**

First Concept's Continuum series is one of the most powerful ways to use Apples with mainframes in a distributed-data-processing network. The system allows for the greatest flexibility of any software product we have seen. Not only does one mainframe handle multiple databases from different vendors, but the network can also encompass more than one mainframe. The Continuum series combines well-thought-out products with an excellent level of support and training. +

**▶ CONTACT**

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EDD runs on Apple II, II plus (including most compatibles), IIe, and III (in emulation mode), with one or two 3.3 disk drives.

EDD is the most powerful copy program available for backing up your protected Apple software.
Since EDD has been preset to copy a broad range of copy-protections, many disks can be copied easily, without changing messy parameters. Even though you rarely need to change them, each parameter is fully described in the operating manual. Unlike the copycards, which only copy single load programs, EDD backs up entire disks. Thus, not only copying single load, but, multi disk access programs as well. We feel on an average, EDD can back up many more protected disks than all other copy programs or copycards put together.

**ESSENTIAL DATA DUPLICATOR III™**

- Automatically copies most protections.
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- Can copy ¼ and ¾ tracks
- Updated program lists available
- Unlike copycards, EDD backs up entire disks, not just what's in memory

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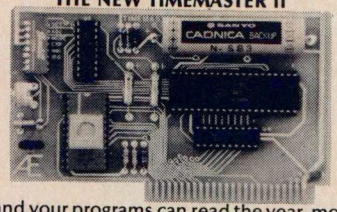
# Apple Peripherals Are All We Make
## That's Why We're So Good At It!

### THE NEW TIMEMASTER II

Automatically date stamps files with PRO-DOS



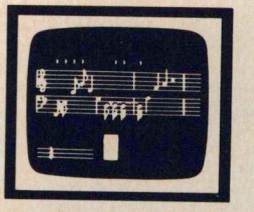
NEW 1984 DESIGN
An official PRO-DOS Clock

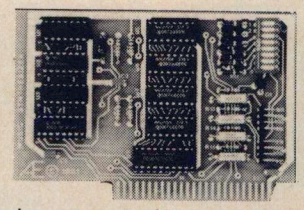
- Just plug it in and your programs can read the year, month, date, day, and time to 1 millisecond! The only clock with both year and ms.
- NiCad battery keeps the TIMEMASTER II running for over ten years.
- Full emulation of ALL other clocks. Yes, we emulate Brand A, Brand T, Brand P, Brand C, Brand S and Brand M too. It's easy for the TIMEMASTER to emulate other clocks, we just drop off features. That's why we can emulate others, but others CAN'T emulate us.
- The TIMEMASTER II will automatically emulate the correct clock card for the software you're using. You can also give the TIMEMASTER II a simple command to tell it which clock to emulate (but you'll like the Timemaster mode better). This is great for writing programs for those poor unfortunates that bought some other clock card.
- Basic, Machine Code, CP/M and Pascal software on 2 disks!
- Eight software controlled interrupts so you can execute two programs at the same time (many examples are included).
- On-board timer lets you time any interval up to 48 days long down to the nearest millisecond.

The TIMEMASTER II includes 2 disks with some really fantastic time oriented programs (over 40) including appointment book so you'll never forget to do anything again. Enter your appointments up to a year in advance then forget them. Plus DOS dater so it will automatically add the date when disk files are created or modified. The disk is over a $200.00 value alone—we give the software others sell. All software packages for business, data base management and communications are made to read the TIMEMASTER II. If you want the most powerful and the easiest to use clock for your Apple, you want a TIMEMASTER II.

**PRICE $129.00**

### Super Music Synthesizer
### Improved Hardware and Software

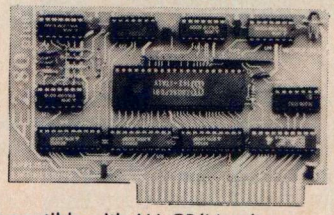




- Complete 16 voice music synthesizer on one card. Just plug it into your Apple, connect the audio cable (supplied) to your stereo, boot the disk supplied and you are ready to input and play songs.
- It's easy to program music with our compose software. You will start right away at inputting your favorite songs. The Hi-Res screen shows what you have entered in standard sheet music format.
- Now with new improved software for the easiest and the fastest music input system available anywhere.
- We give you lots of software. In addition to Compose and Play programs, 2 disks are filled with over 30 songs ready to play.
- Easy to program in Basic to generate complex sound effects. Now your games can have explosions, phaser zaps, train whistles, death cries. You name it, this card can do it.
- Four white noise generators which are great for sound effects.
- Plays music in true stereo as well as true discrete quadraphonic.
- Full control of attack, volume, decay, sustain and release.
- Will play songs written for ALF synthesizer (ALF software will not take advantage of all our card's features. Their software sounds the same in our synthesizer.)
- Our card will play notes from 30HZ to beyond human hearing.
- Automatic shutoff on power-up or if reset is pushed.
- Many many more features.

**PRICE $159.00**

### Z-80 PLUS!



- TOTALLY compatible with ALL CP/M software.
- The only Z-80 card with a special 2K "CP/M detector" chip.
- Fully compatible with microsoft disks (no pre-boot required).
- Specifically designed for high speed operation in the Apple IIe (runs just as fast in the II+ and Franklin).
- Runs WORD STAR, dBASE II, COBOL-80, FORTRAN-80, PEACHTREE and ALL other CP/M software with no pre-boot.
- A semi-custom I.C. and a low parts count allows the Z-80 Plus to fly thru CP/M programs at a very low power level. (We use the Z-80A at fast 4MHZ.)
- Does EVERYTHING the other Z-80 boards do, plus Z-80 interrupts.

Don't confuse the Z-80 Plus with crude copies of the microsoft card. The Z-80 Plus employs a much more sophisticated and reliable design. With the Z-80 Plus you can access the largest body of software in existence. Two computers in one and the advantages of both, all at an unbelievably low price.

**PRICE $139.00**

### Viewmaster 80

**There used to be about a dozen 80 column cards for the Apple, now there's only ONE.**

- TOTALLY Videx Compatible.
- 80 characters by 24 lines, with a sharp 7x9 dot matrix.
- On-board 40/80 soft video switch with manual 40 column override
- Fully compatible with ALL Apple languages and software—there are NO exceptions.
- Low power consumption through the use of CMOS devices.
- All connections are made with standard video connectors.
- Both upper and lower case characters are standard.
- All new design (using a new Microprocessor based C.R.T. controller) for a beautiful razor sharp display.
- The VIEWMASTER incorporates all the features of all other 80 column cards, plus many new improvements.

| | PRICE | BUILT IN SOFTSWITCH | SHIFT KEY SUPPORT | LOW POWER DESIGN | 80 COLUMN HOME | 7x9 DOT MATRIX | LIGHT PEN INPUTS | 40 COLUMN OVERRIDE | INVERSE CHARACTERS |
|---|---|---|---|---|---|---|---|---|---|
| **VIEWMASTER** | **179** | **YES** | **YES** | **YES** | **YES** | **YES** | **YES** | **YES** | **YES** |
| SUP'RTERM | MORE | NO | YES | NO | NO | NO | NO | YES | YES |
| WIZARD80 | MORE | NO | NO | NO | NO | YES | NO | YES | YES |
| VISION80 | MORE | YES | YES | NO | NO | YES | NO | NO | NO |
| OMNIVISION | MORE | NO | YES | NO | NO | NO | NO | YES | YES |
| VIEWMAX80 | MORE | YES | YES | NO | NO | YES | NO | NO | YES |
| SMARTERM | MORE | YES | YES | NO | NO | NO | YES | YES | NO |
| VIDEOTERM | MORE | NO | NO | YES | NO | YES | YES | NO | YES |

The VIEWMASTER 80 works with all 80 column applications including CP/M, Pascal, WordStar, Format II, Easywriter, Apple Writer II, VisiCalc, and all others. The VIEWMASTER 80 is THE MOST compatible 80 column card you can buy at ANY price!

**PRICE $179.00**

### MemoryMaster IIe 128K RAM Card

- Expands your Apple IIe to 192K memory.
- Provides an 80 column text display.
- Compatible with all Apple IIe 80 column and extended 80 column card software (same physical size as Apple's 64K card).
- Can be used as a solid state disk drive to make your programs run up to 20 times FASTER (the 64K configuration will act as half a drive).
- Permits your IIe to use the new double high resolution graphics.
- Automatically expands Visicalc to 95 K storage in 80 columns! The 64K config. is all that's needed, 128K can take you even higher.
- PRO-DOS will use the MemoryMaster IIe as a high speed disk drive.
- Precision software disk emulation for Basic, Pascal and CP/M is available at a very low cost. NOT copy protected.
- Documentation included, we show you how to use all 192K.

If you already have Apple's 64K card, just order the MEMORYMASTER IIe with 64K and use the 64K from your old board to give you a full 128K. (The board is fully socketed so you simply plug in more chips.)

| | |
|---|---|
| **MemoryMaster IIe with 128K** | **$249** |
| **Upgradeable MemoryMaster IIe with 64K** | **$169** |
| **Non-Upgradeable MemoryMaster IIe with 64K** | **$149** |

Our boards are far superior to most of the consumer electronics made today. All I.C.'s are in high quality sockets with mil-spec. components used throughout. P.C. boards are glass-epoxy with gold contacts. Made in America to be the best in the world. All products work in the APPLE IIE, II, II+ and Franklin. The MemoryMaster IIe is IIe only. Applied Engineering also manufactures a full line of data acquisition and control products for the Apple; A/D converters and digital I/O cards, etc. Please call for more information. All our products are fully tested with complete documentation and available for immediate delivery. All products are guaranteed with a no hassle **THREE YEAR WARRANTY.**

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# Your Modem is on Vacation

## Unless it's using TRANSEND

### New for the Apple IIc and IIe Easy Com/Easy Go Communications Software

Introducing the telecommunications software that will put your modem back to work. If you want to send a letter, chat on the Source℠, check your financial situation on Dow Jones℠, get flight information on OAG, check the news and sports out on Newsnet, obtain some legal or medical files with the Knowledge index, send an overnight letter through MCI mail or Western Union's Easy Link, or even line yourself up with a date in a city you'll be traveling to, then get your modem back to work with Easy Com/Easy Go, new from TRANSEND.

If you want to swap files, programs, or games, Easy Com/Easy Go will do it in either CP/M, DOS 3.3, PASCAL, or PRODOS — and we'll even verify your transfer to make sure you've got it all and in good order.

### Its Built-In Text Editor Is Always Ready to Go

Now with Easy Com/Easy Go you can write or receive information, replace a word or sentence, move a paragraph, or modify the margins. All this is a simple job for Easy Com/Easy Go. Then with just one keystroke you have sent it—and at a speed of over 670,000,000 MPH. Print it, or save it on disk just as easily.

### It's Simple But Not Stupid

It knows the basics such as telephone number retention, Auto-Logon, on line printing, has a big Capture Buffer and auto disk save. But that's not all. Easy Com/Easy Go also handles advanced operations including keyboard macros, redefinition of the keyboard, XON/XOFF, verification protocol, and multiple flow control options. It works as well with most modems as it does with Transend's own modem, and at speeds up to 1200 Baud. Compatible with all Apple II's, Easy Com/Easy Go is so simple even a mouse can use it.

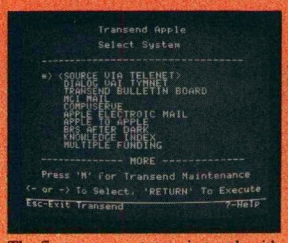
### Limited Time Offer

With each purchase, receive offers worth over $400 from leading information services like Dow Jones News Retrieval℠, The Source℠, MCI Mail, OAG, Newsnet, Dialog Knowledge Index, and Western Union Easy Link.

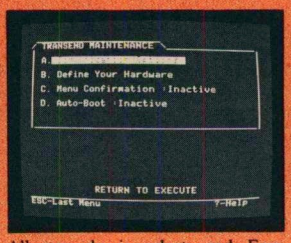
### Money Back Guarantee

If Easy Com/Easy Go doesn't put your modem back to work within 30 days, we'll give you your money back.

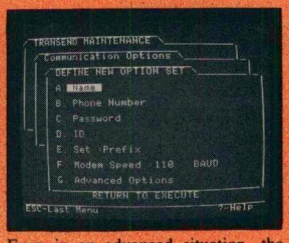
### So Easy You'll Think *You're* on Vacation




The first screen gets you in touch with a service — **preprogrammed.**




All you do is select, and Easy Com/Easy Go does the rest.




Even in an advanced situation, the screens are easy to use.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part three

**▶ LINKING APPLES TO MAINFRAMES**

BY ROBERT COWART AND STEVE ROSENTHAL

# David Talks to Goliath through a Variety of Software

Hardware alone isn't enough to connect Apples and mainframe computers. Once all the wiring and plugging in are finished, the machines on both sides of your connection still need the right software. At the Apple end, the software must take care of both the communications link and the particular way you have your hardware configured. Since some mainframes are able to communicate only with specific terminals, the software may also have to disguise an Apple to look like something it is not.

None of this adaptation is easy, especially for the mainframe half of the marriage. Why? Because many of these larger machines were designed without microcomputers in mind. They are set in many of their ways and use software that is expensive and complex, at least compared to programs for the Apple.

Luckily, personal computers are more flexible. With a little help from software and hardware, your Apple can be accommodating to a mainframe. Unless you're responsible for a mainframe that must send and receive detailed file or database information from many personal-computer users, it's much wiser (and easier) to do a little remodeling on the Apple side of the fence, where software is considerably cheaper, the necessary effort is smaller (you can usually install the programs yourself), and the total investment in time is significantly lower.

Software for Apples comes in two basic classes, mirroring the two very different communications modes the bigger machines employ.

**Speaking in Tongues**

The first class of software matches a communications protocol, favored by mainframes, that is familiar to many microcomputer users—the asynchronous communications protocol. It is the same method that interfaces terminals, serial printers, and modems to microcomputers as well as minicomputers. When you hook up an Apple with a serial card to a printer or through a modem to another computer or a bulletin board, you're using asynchronous communications.

To use async communications, the main thing you need is software. Any Apple with a serial port (or a serial card for the II family) already has the basic hardware. If you're hooking up to another system by telephone, you'll need a modem as well.

If you have been using CompuServe or The Source, for example, you are already familiar with the use of a typical asynchronous-software package that involves serial connection and a modem. These packages are relatively inexpensive ($50–$300) and range from bare bones to opulent capabilities.

At the very least, an async-communications program allows you to log on to a distant computer system and interact as though you were using a local terminal instead of your Apple. Data appears on the screen as you receive it from the distant computer and as you type it on the keyboard.

In the basic terminal mode (sometimes called the "dumb terminal" mode), these communications packages make your Apple act like a video equivalent of a simple Teletype terminal. The only characters the program has to respond to and be able to display on screen are the printable numbers and letters, carriage returns, line feeds, and backspaces. The characters are all sent and received in the same ASCII character code that all Apples and other personal computers use.

Even a bare-bones package must include an installation program, though, to customize the communications package to your specific hardware setup. This task is not trivial, considering the number of modems, serial boards, printers, operating systems, and screen-display options around.

For the Apple II family of computers, some of the popular programs that provide this basic TTY emulation include Access II from Apple, Acculink,

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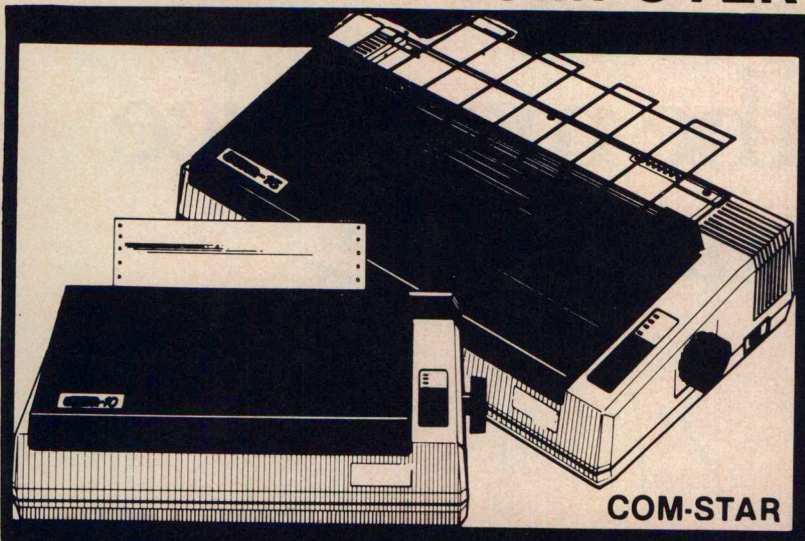


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### ** DELUXE COMSTAR T/F 80 CPS Printer — $169.00

This COMSTAR T/F (Tractor Friction) PRINTER is exceptionally versatile. It prints 8½" x 11" standard size single sheet stationary or continuous feed computer paper. Bi-directional, impact dot matrix, 80 CPS, 224 characters. (Centronics Parallel Interfact).

### Premium Quality 120-140 CPS 10" COM-STAR PLUS+ Printer $269.00

The COM-STAR PLUS+ gives you all the features of the COMSTAR T/F PRINTER plus a 10" carriage, 120-140 CPS, 9 x 9 dot matrix with double strike capability for 18 x 18 dot matrix (near letter quality), high resolution bit image (120 x 144 dot matrix), underlining, back spacing, left and right margin settings, true lower decenders with super and subscripts, prints standard, italic, block graphics and special characters. It gives you print quality and features found on printers costing twice as much!! (Centronics Parallel Interface) (Better than Epson FX80). List $499.00 **SALE $269.00**

### Premium Quality 120-140 CPS 15½" COM-STAR PLUS+ Business Printer $379.00

Has all the features of the 10" COM-STAR PLUS+ PRINTER plus 15½" carriage and more powerful electronics components to handle large ledger business forms! (Better than Epson FX 100). List $599 **SALE $379.00.**

### Superior Quality 140-160 CPS 10" COM-STAR PLUS+ IBM IBM Pers/Bus Printer $389.00

Has all the features of the 10" COM-STAR PLUS+ PRINTER! It is especially designed for all IBM personal computers! 140-160 CPS HIGH SPEED PRINTING 100% duty cycle, 2K buffer, diverse character fonts, special symbols and true decenders, vertical and horizontal tabs.
A RED HOT IBM personal business printer at an unbelieveable low price of $389.00 plus one year immediate replacement warranty (centronics parallel interface) List $699 **SALE $389.00**

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The **Super Com-Star+ High Speed Business Printer** 160-180 CPS has a 10" Carriage with all the Com-Star+ features built in! The 15½" **High Speed Business Printer** is especially designed with more powerful electronics to handle larger ledger business forms! Exclusive bottom feed! (Centronics parallel interface) **One year immediate replacement warranty**. The 15½" printer is also compatable with IBM Personal/Business Computers! 15½" Printer List $699.00 **SALE $399.00**

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### Executive Letter Quality DAISY WHEEL PRINTER $399.00

This is the worlds finest daisy wheel printer **Fantastic Letter Quality,** up to 20 CPS bidirectional, will handle 14.4" forms width! Has a 256 character print buffer, special print enhancements, built in tractor-feed (Centronics Parallel and RS232C Interface) List $699 **SALE $399.**

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Microsoft® Premium SoftCard™ IIe is the high-performance CP/M® board that really juices the Apple® IIe.

**Hard facts on SoftCard.**

It has a high speed (6MHz) Z-80 that runs CP/M up to three times faster than lesser boards. Plus 64K memory and 80-column display that fits the IIe auxiliary slot and acts like Apple's own Extended 80-column Card. So it works with CP/M, Apple DOS and ProDOS programs, too.

Microsoft BASIC is built-in, so it's compatible with more Apple CP/M software than any other board on the market: Thousands of the juiciest business programs including dBase II,® WordStar® and sophisticated Microsoft languages like FORTRAN-80, COBOL and BASIC Compiler.

It also has a new low price.

Juicing up the performance of computers is nothing new for us. We invented the SoftCard and make versions for the entire Apple family. We wrote Applesoft for the Apple II. In fact, our BASIC is the language spoken by nine out of ten microcomputers worldwide.

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CIRCLE 320 ON READER SERVICE CARD

ASCII Express, BLAST, Data Capture, MITE, Modem Magic, TermExec, The Connection, Transend, VisiTerm, and Z-Term. On the Macintosh, along with Apple's MacTerminal and Dennis Brothers' MacTEP (listed in the July issue of *A+* on page 96 and 97), you can also choose from MacAck, MacModem, and a growing number of other terminal-emulation programs. The Lisa can use many of the Macintosh programs, along with Apple's Lisa-Terminal.

Most of these packages can do more than just imitate a simple Teletype. Many communications programs also allow uploading and downloading of files from a mainframe to an Apple. At the Apple end, you can, in most cases, store and retrieve files from disk and tuck them away in memory.

Uploading a file or downloading one for later analysis can save you a great deal of time and money when you're using information services that charge by the minute. You can create a message or document off-line, connect to the mainframe, and send the file off to the receiving computer within minutes.

Some examples of programs that support file uploading and downloading are Apple's Access II, MacTerminal, and LisaTerminal. From independent vendors, typical programs include Aculink, ASCII Express, BLAST, ERA 2, MITE, and Transend, among others.

Many communications programs for the Apple offer even more advanced features, some of which may seem needlessly complex at first, but which you may later regard as valuable conveniences. For example, some programs let you store "scripts" or "macros" that set up communications links automatically. Once set up, a script can typically dial a phone number, log on to an information service, type in your password and I.D. number, and issue the necessary commands to move into the data area that you use most often. Among the programs offering this feature are Apple's Access II, ASCII Express, Softerm 2, and Transend.

**You must have software and hardware that 'disguise' your system.**

**Terminal Emulation**

Most any of the popular programs will suffice for connecting you to public networks such as CompuServe. Tying into a private, in-house, corporate mainframe isn't as easy, though. Even after you've successfully surmounted the hardware impediments of hooking up (see "The Apple Connection," on page 57 of this issue), another problem remains. Most private systems are designed for use with only one or two specific types of terminals. To connect your Apple to the mainframe, you must have software and hardware that "disguise" your system as an appropriate kind of terminal.

For use with mainframes, the most popular terminals are the IBM 3278 series. In the minicomputer world, either the DEC VT-52 or VT-100 predominate. You must have the right terminal or make your microcomputer look like the right terminal by using a "terminal emulator." A terminal emulator can consist of a combination software/hardware package, or just software alone. In any case, terminal emulation is not a simple trick. The package must be able to handle data input and output (preferably at relatively high rates of speed) while, at the same time, manag-


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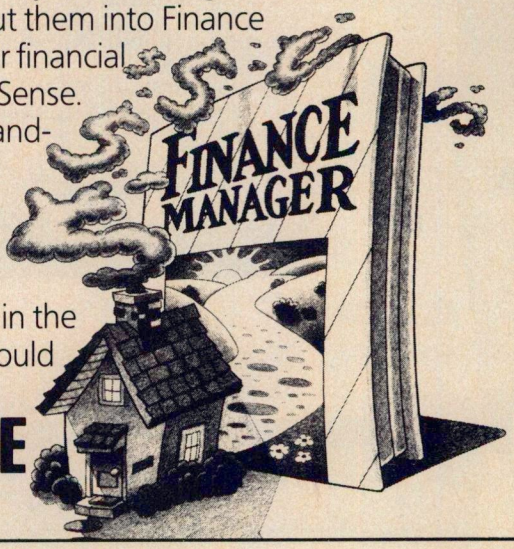
Take all the cash you have in the bank. All the money in your checking account. Your stocks. Bonds. And of course, all your investments, and put them into Finance Manager. Nothing's easier to handle, or keeps track of your financial situation better. Not even Home Accountant or Dollars & Sense. Finance Manager is by far the most efficient and understandable home finance program available. It helps you record your income, expenses, and transactions. Budget your money, make financial plans, organize your tax records, and help you evaluate investments and payment plans. And it has everything you need to keep your bottom line in the black. So go ahead and spring for a Finance Manager. It could be the best investment that you'll ever make.

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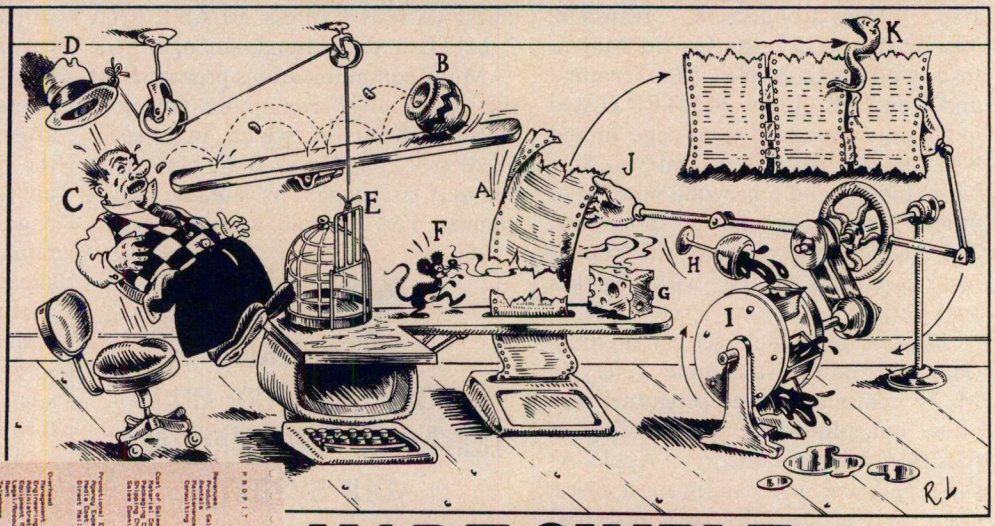
# SIMPLIFIED SPREADSHEET ASSEMBLY

RISING SPREADSHEET (A) KNOCKS MEXICAN JUMPING BEANS (B) INTO MOUTH OF NEUROTIC MAN (C) WHO IS SO DISCOMBOBULATED THAT HIS HAIR STANDS ON END, DISLODGING HAT (D) WHICH OPENS CAGE (E) AND RELEASES EPICUREAN MOUSE (F).

MOUSE, INSPIRED BY SCENT OF PERFECTLY AGED CAMEMBERT CHEESE, GNAWS THROUGH SPREADSHEET, ONLY TO DISCOVER HE HAS BEEN FOOLED BY AROMA OF OVER-RIPE GORGONZOLA (G).

IN A FIT OF PIQUE HE SPILLS VINTAGE WINE (H) INTO WATER-WHEEL (I) WHICH TURNS PULLEY THAT CAUSES GLOVE (J) TO GRASP SPREADSHEET AND MOVE IT TO TAPING AREA.

SHEET IS TAPED SECURELY IN PLACE BY TRAINED ADHESIVE TAPE WORM (K).




# MADE SIMPLE.

Now you can save time, aggravation, adhesive tape, and Gorgonzola cheese by following one simple direction—Sideways. It's the unique software program that lets you output all the spreadsheet columns you need, all on one continuous page, all with one print command—and all for only $60!

The New York Times calls Sideways "one small program that solves a big problem for computer users". You'll agree. Sideways can print as wide a spreadsheet as you can invent with VisiCalc,® Multiplan,® or other programs. You can also use it for those far-into-the-future schedules and pert charts you create with your word processor. And there's more—Sideways gives you complete control over margins and character spacing, and lets you choose from a variety of type sizes. For any wide text file, for dozens of uses, the way to go is Sideways.

You can go Sideways today with your Apple® II and a wide variety of dot matrix printers, including Epson,® Okidata, Apple DMP, and Imagewriter. Ask for Sideways at leading computer stores. Or mail a $60 check to Funk Software, P.O. Box 1290, Cambridge, MA 02238. (617) 497-6339. MC/Visa accepted. Send no Mexican jumping beans, please.

## SIDEWAYS™

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ing display of data on the screen, and possibly handling the disk drives as well—not losing any data all the while.

In addition, most mainframe terminals have special keys and lights that you won't find on your Apple, and the terminal emulator must handle control codes associated with these capabilities.

Emulating most popular asynchronous terminals is primarily a software task. Once you find out what terminal your mainframe expects, you just have to match up the terminal with a software package that includes that particular terminal model in its repertoire. A few programs, such as Disco-Tech's Talisman, Softronics' Softerm 2, and Communications Research Group's BLAST, imitate dozens of terminals, but most software packages for the Apple specialize in one or two. Other terminal emulators for the Apple family include ASCII Express Professional, MacTerminal, and LisaTerminal.

For working with big machines from IBM and other mainframe manufacturers, you may also need an asynchronous-terminal-emulator program, even though the actual communication with the mainframe may involve the IBM bisynchronous-communications (also known as bisync or BSC) standards. Many of the hardware boxes that interface Apples to these systems connect to the Apple as if the boxes were asynchronous computers communicating with VT-100 terminals. The Apple, then, needs a terminal-emulator package to look like a VT-100.

You can use any of the communications programs that emulate the VT-100 terminal, but a few of the programs have been customized to work with protocol converters. For example, with Apple's MacTerminal, which simulates a VT-100, you can use the extra keys that an IBM 3278 terminal has but a Macintosh does not by clicking on key images on a pull-down menu. Apple also offers Access 3270 for the Apple III and LisaTerminal for the Lisa set up to work with the Appleline protocol-converter box from Apple.

**Emulating most popular asynchronous terminals is primarily a software task.**

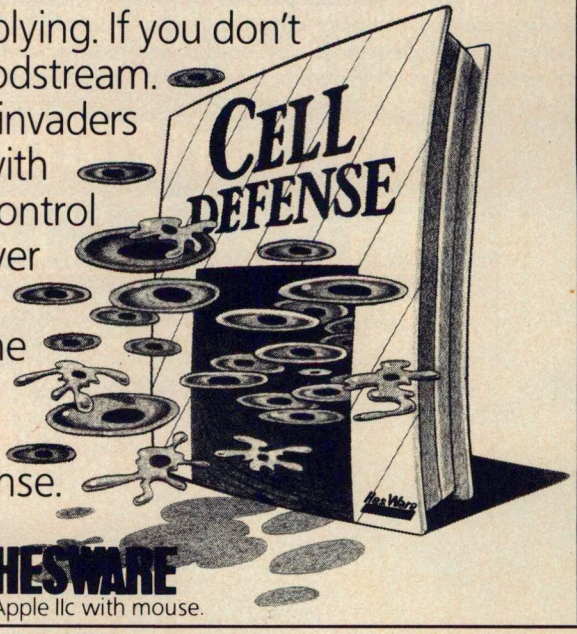
For the Apple II, Apple sells a protocol converter built into a standard plug-in card. With it, you don't need terminal-emulator software. Rather, you require one of two custom programs available specifically for this card. One program sets the card to imitate an IBM 3278 terminal attached to a 3274 Controller; the other turns the Apple into a look-alike of the IBM 2780 and 3780 Remote Job Entry systems.

All the programs we've discussed work with a mainframe that is operating normally, making the Apple jump through hoops to talk with it. With the ever-increasing popularity and visibility of micros in the business environment, however, more mainframe software is becoming available. Programs to transfer and use files created by VisiCalc (DIF format), Multiplan files (SYLK format), and dBASE II (.DBF) files are now available for some machines. For a look at an innovative and comprehensive mainframe-software product for using Apples in a distributed-processing network, see "Continuum," on page 39 of this issue. ✚

*For more information on the products discussed in this article, see page 52.*


# STOP THE SPREAD OF A DEADLY VIRUS.

Quick. Deadly viruses are rapidly multiplying. If you don't act fast, they'll infiltrate your entire bloodstream. And in seconds it'll be over. So blast the invaders with interferon. And annihilate them with macrophages. With Cell Defense, you control your own immune system. You'll discover basic concepts in biology. And explore exciting scientific strategies. While at the same time, leading an attack against a host of deadly viruses. So get yourself the science simulation game Cell Defense. Your life may depend on it.

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For the Commodore 64, Apple II, and Apple IIc with mouse.

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# Top Modem

• Hayes Compatible • More Features • Only $495

The best price/performance ratio of any 212A modem on the market today for under $500! That puts ProModem 1200 on top of the stack. Compare the 26 features. You'll see why. Only ProModem offers all 26. 15 are exclusive.

They're important features. The Real Time Clock/Calendar for example. Used with Applications Programs, or the OPTIONS PROCESSOR, gives you pre-set timed operation of the modem. Also, time and duration records of all calls. The convenient HELP command makes ProModem easy to use. It promptly displays the Instructions Menu whenever there's a question about what to do next. With Call Progress Detection, you can "tell" ProModem to do things like automatically "Redial When Busy."

It's the only modem that lets you expand into a full telecommunications center with add-ons. The OPTIONS PROCESSOR gives you Data Store and Time Base Continuity with battery backup, Personal/Business Telephone Directory, and Automatic Receipt/Transfer Buffer, expandable to 64K. The OPTIONS PROCESSOR also enables ProModem to operate unattended, with or without your computer.

The optional 12-character ALPHANUMERIC DISPLAY indicates modem operating status, system diagnostics, message status, phone numbers, and real time clock data. . . to name just a few.

Together, these standard and optional features give you a sophisticated electronic mail and communications capability unmatched by any other modem in this class. And, there's more. See your local dealer for additional information and a demonstration. He'll show you why ProModem 1200 is tops.

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NOW AVAILABLE
- ProModem plug-in cards for IBM PC and Apple II
- ProCom Software

212A Modem Comparison Chart *

| STANDARD FEATURES | PRO | HAYES STACK | NOVATION SMARTCAT+ | ANCHOR 1200 | US ROBOTICS PASSWORD |
|---|---|---|---|---|---|
| 300/1200 Baud (212A) | ✓ | ✓ | ✓ | ✓ | ✓ |
| Intelligent Microprocessor | ✓ | ✓ | ✓ | ✓ | ✓ |
| Tone and Pulse Dialing | ✓ | ✓ | ✓ | ✓ | ✓ |
| Hayes Command Compatible (Works with Smartcom™) | ✓ | ✓ | ✓ | ✓ | |
| Additional telephone jack with exclusion switching | ✓ | | | ✓ | |
| Analog loop back self test | ✓ | ✓ | ✓ | | |
| Self Test at Power Up | ✓ | | ✓ | | |
| Call Progress Detection (Busy, Dial Tones, Trunk Busy, etc.) | ✓ | | ✓ | | |
| Speaker and External Volume Control | ✓ | ✓ | ✓ | | |
| Full Complement of Status Lights | ✓ | ✓ | | | |
| 8 Switch Selectable power-up defaults | ✓ | ✓ | | | |
| Adaptive Dialing | ✓ | | | | |
| Auto Redial on Busy | ✓ | | ✓ | | |
| Ergonomically designed easy to read front display panel | ✓ | | | | |
| Internal Stand-Alone Power Supply | ✓ | | | | |
| Built in Real Time Clock/Calendar | ✓ | | | | |
| Help Command | ✓ | | | | |
| 300 baud connect while maintaining 1200 baud RS-232 link | ✓ | | | | |
| **EXPANDABLE OPTIONS** | | | | | |
| Automatic Receiver Buffer | ✓ | | | | |
| Automatic Transmit Buffer | ✓ | | | | |
| On-board Personal/Business Directory | ✓ | | | | |
| Buffer, Expandable to 64K | ✓ | | | | |
| Auto Logon Macros | ✓ | | | | |
| Auto message transmission to groups of numbers | ✓ | | | | |
| Records call duration | ✓ | | | | |
| 12-character Alphanumeric Display | ✓ | | | | |

*Comparison made by Prometheus on the basis of the best information available to Prometheus at time of printing.

CIRCLE 158 ON READER SERVICE CARD

## ▶ PRODUCT INFORMATION

**Acculink**
IE Systems
112 Main Street
Newmarket, NH 03857
(603) 659-5891
**List Price:** $245 for the Apple; $2445, $995, and $1475 for the DEC 10/20, PDP 11, and VAX, respectively
**Requires:** Apple II, II Plus, or IIe
**Notes:** Two products—one for the Apple and one for the larger computer. Acculink for Apple is a general-purpose async-communications program. Buying the Acculink program for the DEC 10/20, PDP 11, or VAX allows binary-file transfer with error checking from the Apple II. These are software-only products.
CIRCLE 550 ON READER SERVICE CARD

**Apple Access 3270 and 3780/2780**
Apple Computer, Inc.
20525 Mariani Avenue
Cupertino, CA 95014
(408) 996-1010
**List Price:** $300 each for software packages
**Requires:** Apple II, II Plus, IIe, or Apple III with Appleline
**Notes:** Two separate programs—they allow the Apple to emulate an IBM 3274 Cluster Controller attached to a 3278 Display or 2780/3780 Remote Job Entry Terminal.
CIRCLE 551 ON READER SERVICE CARD

**ASCII Express—The Professional**
United Software
1880 Century Park East
Suite 311
Los Angeles, CA 90067
(213) 556-2211
**List Price:** $129.95
**Requires:** Apple II, II Plus, IIe, or IIc; ProDOS
**Notes:** Works with 48K and 64K systems. Lowercase generator optional. Supports many printer and modem interfaces and either 40- or 80-column screen. Also supports phone-number library and macro definitions. The TTY for the Deaf (Baudot mode) is available if you use an Apple-CAT modem. Built-in text editor.
CIRCLE 552 ON READER SERVICE CARD

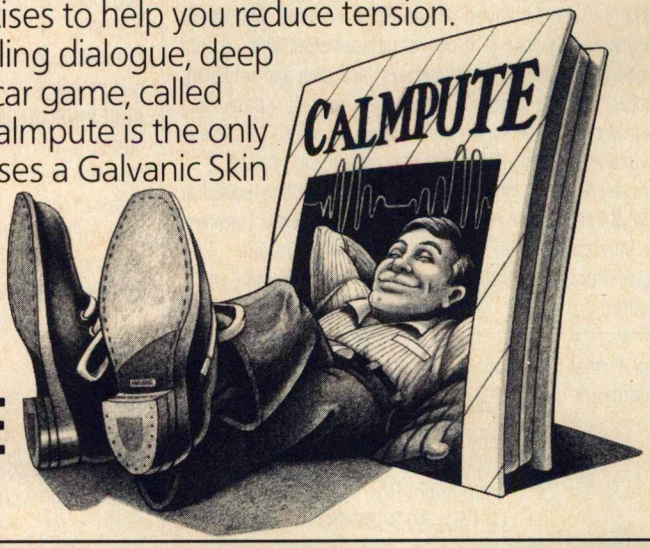
**BLAST**
Communications Research Group, Inc.
8939 Jefferson Highway
Baton Rouge, LA 70808
(504) 923-0888
**List Price:** $250
**Requires:** Apple II, II Plus, or IIe with DOS 3.3, or Macintosh
**Notes:** Available for 70 different micros, minis, and mainframes. If you have BLAST on one machine only, you can send and receive ASCII text only, without error checking. With BLAST on both ends, however, you can send and receive binary data as well as ASCII text, with error checking.
CIRCLE 553 ON READER SERVICE CARD

**DataTalker II, DataTalker/Mac**
Winterhalter & Associates
3853 Research Park Drive
P.O. Box 2180
Ann Arbor, MI 48106
(313) 662-2002 or (800) 321-7785
**List Price:** $1095 for the Mac; $995 for the II family (software/hardware package)
**Requires:** Mac or Apple II, II Plus, or IIe. Z80 card and CP/M required on Apple II.
**Notes:** The Mac program allows 3270-series bisync emulation. The II program does 3270/3780 bisync.
CIRCLE 554 ON READER SERVICE CARD

*(Continued on page 54)*


# TO CONTROL STRESS, TAKE ONE AND USE DAILY.

Calmpute is an effective biofeedback program that accurately monitors your level of stress, while suggesting proper exercises to help you reduce tension. Or increase it, if need be. Through revealing dialogue, deep relaxation exercises, and a challenging car game, called CalmPrix, you will learn stress control. Calmpute is the only medical award winning program that uses a Galvanic Skin Response biosensor that you hold in your hand. So get yourself ready for better health. Pick up Calmpute today. It's available over the counter. Without a prescription.




**CALMPUTE™ BY HESWARE**
Apple II

CIRCLE 212 ON READER SERVICE CARD

## PRODUCT INFORMATION

**ERA II**
MicroCom
1400A Providence Highway
Norwood, MA 02062
(617) 762-9310
**List Price:** $499
**Requires:** Apple II, II Plus, IIe, or IIc, or Macintosh with Macmodem
**Notes:** Includes 1200-bps modem. Macmodem will support 2400 bps after December 1984. Utilizes icons and mouse.
CIRCLE 555 ON READER SERVICE CARD

**MITE**
Mycroft Labs
P.O. Box 6045
Tallahassee, FL 32314
(904) 385-1141
**List Price:** $150
**Requires:** Apple II, II Plus, or IIe; CP/M; 48K RAM; 80-column board
**Notes:** Supports various protocols, serial cards, and auto-answer/auto-dial modems.
CIRCLE 556 ON READER SERVICE CARD

**Softerm 2**
Softronics
3639 New Getwell Road
Suite 10
Memphis, TN 38118
(901) 683-6850
**List Price:** $195
**Requires:** Apple II, II Plus, or IIe
**Notes:** Provides emulation of these terminals: ADDS Regent 20, 25, 40, 60; ADDS Viewpoint; Data General D200, Datapoint 3601; DEC VT102, VT52; Hazeltine 1400, 1410, 1500, 1520; Hewlett-Packard 2622A; Honeywell VIP7205, VIP7801, VIP7803; IBM 3101 Model 10 and 20; Lear Siegler ADM-3A, ADM-5; and TeleVideo 910, 925, 950.
CIRCLE 557 ON READER SERVICE CARD

**Talisman Terminal Emulator**
Disco-Tech
Morton Technologies
Box 1659
Santa Rosa, CA 95402
(707) 527-8500
**List Price:** $125
**Requires:** Apple II with CP/M, Z80 card, and 80-column card, or Apple III with CP/M
**Notes:** Emulates DEC VT-100, IBM 3101, and 50 other terminals.
CIRCLE 558 ON READER SERVICE CARD

**TD-830 Emulator Package**
Core Technologies
7201 West Saginaw
Lansing, MI 48917
(517) 321-4659
**List Price:** $695 for the emulator package
**Requires:** Apple II Plus with 80-column card, Apple IIe, or Apple III; 64K RAM
**Notes:** A hardware/software package that works with all Burroughs computers. Also available for $1500 is a series of programs to allow file uploading and downloading between Burroughs and Apple. Includes programs for both the Apple and the Burroughs.
CIRCLE 559 ON READER SERVICE CARD

**Terminus**
Quark, Inc.
2525 West Evans, Suite 220
Denver, CO 80219
(303) 934-2211
**List Price:** $89
**Requires:** Apple II, II Plus, IIe, or IIc with ProDOS, or Apple III
**Notes:** Optional Word Juggler interface allows editing during transmission.
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# TELEMAX, INC. ENHANCEMENT PRODUCTS

***WE turn Apples and Franklins into gold, with a little alchemy and lots of engineering.***

## RGB COLOR BOARDS

Apple 11, 11+, 11e; Franklin ACE 1000, 1200, 100 (color or monochrome)

**The Color Master VCB-8**

The new video board that provides RGB (red/green/blue) video signals for crisp, vivid displays of color graphics and text, with exceptional resolution and color quality, is now available.

Can be used with 80 column text, so both color graphics and text are displayed on **one** RGB monitor. **Text can be displayed in anyone of 8 colors, software selectable.** A text **mode enhancement circuit improves resolution and readibility.** Board plugs into **slot 7** and comes with 4' cable for signal output. **Optional monitor connector**, wired to cable is available (specify RGB monitor make and model).

For the Apple 11 or 11+, the optional **VSS-80 softswitch or VSP-80 switchplate** can be used to interface **Videx Videoterm** or **Ultraterm** or other similar boards. For **Franklin** computers, the **VSP-80** is available to implement this feature.

For further information contact your computer dealer/ distributor or:

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**Computer and Video Products**
P.O. Box 339
Warrington, PA 18976
**(215) 343-3000**

**The Kaleidoscope VCB-24**

Has the same specs. as the COLOR MASTER, with the following added features:

**Each text line of 24 lines of text can be independently set to any one of 8 colors, on any one of 8 colors of background.** Software provided.

**Signal output:** RED, GREEN, BLUE, Sync., both composite and H&V. Levels are TTL, both + and −; other outputs: ± 5VDC, +12 VDC. Signals are American Standard. European version is available. Universal RGB monitor compatibility.

**ORDERING INFORMATION:** (board model nos.)

| APPLE | 11, 11+ | 11e | Price |
|---|---|---|---|
| ColorMaster | VCB-8+ | VCB-8e | $139.00 |
| Softswitch | VSS-80 | don't need | 45.00 |
| SwitchPlate | VSP-80 | don't need | 30.00 |
| Kaleidoscope | VCB-24+ | VCB-24E | 199.00 |
| **FRANKLIN** | **Ace 1000, 1200 (rev. B)** | ***Monochrome Ace 1000,100** | **Price** |
| ColorMaster | VCB8-EF | | $169.00 |
| ColorMaster | | VCB-8F | 139.00 |
| Kaleidoscope | VCB-24EF | VCB-24F | 219.00 |
| SwitchPlate | VSP-80 | VSP-80 | 30.00 |

(*earlier models that did not have color)
Monitor connector, wired to cable: $20.00

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**TELEMAX IO, Input/Output Card**
Gives user access to the following:
1) Four 8 bit input or output ports (total 32 lines of I/O)
2) Two handshake lines for each port (total 8 lines)
3) Four powerful 16 bit timers, real time or stopwatch.
4) Two shift registers
5) Card may be used in any slot from 1 to 7
6) Suitable for robotics or other control of external equipment. TIO-8 **$169.00**

**TELEMAX Rom/Ram Card**
Provides up to 32K of either ROM or RAM storage; user can install CMOS RAM for data or program storage; data can be maintained for 2 years with on-board battery backup. Programs stored in RAM or ROM can be used with other programs. Has 8 bit I/O port for accessing external circuitry. TRR-32 **$199.00**

**Barcode Reader** Standalone system, with wand, ASCII RS232 output, built-in CPU; may be used with any micro or mainframe. Reads LOGMARS. (3 of 9 and others) **$595.00**

**Barcode Printer Software** for Apple 11e and Epson Printers. **$299.00**

Prices & specifications are subject to change without notice.

CIRCLE 353 ON READER SERVICE CARD

# Picture it!

***Graphics processing that's easy, flexible and fun!***

You don't have to be an artist or programmer, just select from Baudville's complete line of compatible graphics software. The possibilties are infinite.

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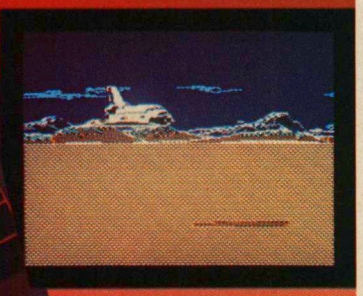
**TAKE 1** Stunning Animation that's fast, smooth, and flicker free!

*Write, produce, and direct your own computer movies. No programming skills are needed to create superb full-color animation. With easy to use TAKE-1, you define animation shapes and movements, "shoot" scenes frame-by-frame, add text at any time, and then combine the scenes to make a complete movie. Perfect for presentations and demos.*

**Premiering:**

- *True sprite capability for multi-layered action without additional hardware.*
- *No size restriction on animated objects.*
- *Complete editing at all stages of production. Can use hi-res pictures, shapes, and fonts from PIXIT or other graphics utilities for background scenes and animation shapes.*
- *A convenient selection of animation libraries are available.*
- *Moving objects can have "windows" that allow background to show through.*
- *Optional programmer's "tool kit" lets you put the power of TAKE-1 animation in your own programs.*

***$59.95 Requires 64K***



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PIXIT

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***Create A Shape*** *using simple keystroke commands.*

***Shape Table Editor*** *allows up to 128 shapes placed anywhere in table.*

***Shape and Font Library*** *provides a convenient selection of pre-drawn shapes and text fonts.*

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*Uses standard hi-res picture and Applesoft shape table files which are compatible with other graphics utilities.*

***Optional Shape Libraries*** *greatly reduce the time required to generate computer art. Each library contains a wide variety of artist drawn shapes for specific areas of interest.*

***$49.95 Requires 48K Optional Libraries @$20 each.***

*For Apple II, Apple II+, Apple //e or compatible computers.*

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*Grand Rapids, Michigan 49506 Phone (616) 957-3036*

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# "My Apple's® telephone just called up the home office!"

Communicating is so easy with a complete telecomputing system from Hayes. Just plug it in—and the world is your Apple. Hayes Smartmodem 300™ is the convenient direct-connect modem for the Apple IIc. And Hayes Micromodem IIe® is the easily installed board modem for the Apple II, IIe, III, and Apple Plus. Packaged with Smartcom I™ companion software, both provide a complete telecomputing system. And best of all, both systems are from Hayes, the established telecomputing leader!

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**We connect you to all the right places.** Bulletin boards, databases, information services—naturally. And that's just the beginning. Let your Apple plan your travel itinerary, including flight numbers, hotel and rental car reservations. Watch it retrieve and analyze daily stock and options prices. Work at home and send reports to and from your office. You can even do your gift shopping by computer!

**Would you care to see our menu?** Make your selection. Really. With Smartcom I, you just order up what you want to do. The program guides you along the way. You can create, list, name, send, receive, print or erase files right from the menu. From the very first time you use it, you'll find telecomputing with Hayes as easy as apple pie!

**We've got your number!** We know that you want a system that's flexible, versatile and accommodating. The Smartmodem 300/Smartcom I system accepts ProDOS,™ DOS 3.3, Pascal and CP/M® operating systems. The Micromodem IIe/Smartcom I system accepts DOS 3.3, Pascal and CP/M operating systems.

Smartcom I also provides you with a directory of the files stored on your disk. And will answer calls to your system, without your even being there.

**Your Apple's telephone goes anywhere the phone lines go.** Hayes modems allow your Apple to communicate with any Bell-103 type modem over ordinary telephone lines. You simply connect directly into a modular phone jack, to perform both Touch-Tone® and pulse dialing. Hayes Smartmodem 300 and Micromodem IIe both transmit at 110 or 300 bits per second, in either half or full duplex.

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part four

**▶ LINKING APPLES TO MAINFRAMES**

BY STEVE ROSENTHAL

# The Apple Connection Takes the Right Hardware

Getting information back and forth between an Apple personal computer and a big mainframe takes more than clever programming. To make the connection, you'll also need the right hardware. Existing mainframe computers were not designed to speak with Apples, nor is changing their ways an easy task. If you want your Apple to connect with a big machine, the Apple will have to do the adapting.

Mainframes, as a rule, expect to communicate with terminals. Thus, the easiest way to connect an Apple and a mainframe is to configure the Apple to electronically imitate the appropriate terminal. Generally, the Apple must act like a simple remote terminal (such as the Digital Equipment Corporation VT-100 or Lear Siegler ADM 3A) or like a member of the more complex IBM 3270 series (see figure 1).

**Terminal Emulation**

Emulation of simple remote terminals is by far the easier method. These terminals communicate in ASCII (the same character-coding method Apples use), using ordinary asynchronous RS-232 serial communications (the Apples' communications method). The Macintosh, Lisa, and IIc all have built-in serial ports, and you can add serial cards to the rest of the Apple family. To a mainframe, an Apple communicating through the serial port looks electrically just like a terminal.

You also need the right "terminal emulation" software package so your Apple will know to send and receive data with the serial port, and you must instruct the software how to imitate the selected terminal's response to formatting commands that accomplish such functions as clearing the screen or positioning the cursor.

Technical and organizational policies, especially in a corporate environment, usually prevent you from simply running a standard serial cable from your Apple and plugging it into the back of a mainframe. You're likely to get remote-terminal access to the mainframe only by telephone, so you'll need a modem at the Apple end.

If the mainframe configuration expects ordinary terminals linked to it through modems, an Applemodem or other similar product will do fine. As with any other modem link, you'll have to make sure your modem is compatible and that you've set the right transmission (bps) rate, start bits and stop bits, parity, word length, and so on. You can obtain the proper settings from the company operating the mainframe you want to communicate with.

**Talking 3270**

Unfortunately, not all mainframes have telephone dial-up ports or other ways of attaching ordinary terminals. Especially as the mainframe size gets larger, it gets to be too much of a chore to support slow-speed terminals that each require a separate line. Instead, most larger systems connect many terminals to a mainframe via a single line and use an entirely different method to regulate the conversation.

The most common, by far, of these terminal families designed for mainframe use is the IBM 3270 series. To emulate a member of the 3270 family, personal computers such as the Apple need some outside help. The 3270 series uses a different character set, a different communications protocol, and even a different type of wiring than ordinary Apple telecommunications equipment does (see box on page 59).

The little box that links these two disparate worlds is called a protocol converter. Apple itself is now marketing a protocol converter called Appleline that is customized for the Apple. So far, it works only with the Macintosh, the Lisa, and the Apple III. Other firms, such as Avatar Technologies and Winterhalter & Associates, have developed instructions for using their standard

personal-computer protocol converters with specific Apple computers.

In fact, if you want to put together your own combination, you can pick from protocol converters from Apple or another company and any Apple computer, including the Apple II. You'll also have to use VT-100 terminal-emulation software from an independent company (under Apple DOS, ProDOS, or CP/M). Most of the converter boxes work in similar ways and cost in the neighborhood of $1000. The emulation software should run you between $50 and $350.

On the Apple's end, the protocol box electronically emulates a mainframe hooked up to communicate with a standard asynchronous terminal (both Apple and Avatar products emulate Digital Equipment Corporation's VT-100). You connect the converter as if it were a modem, but you need a reversing cable or modem eliminator since the serial-interface pinouts on the protocol converter are in the right order for a computer, instead of the order a modem needs. In fact, if you want to connect an Apple to a remote 3270-series controller, you can hook the Apple to a modem, connect that pair by phone to another modem hooked up to a converter, and hook the converter to the controller (see figure 3, page 60).

On the other end, the converter emulates an IBM 3278 Model 2 Display Station, which hooks up with coaxial cable to a cluster controller. You can unplug a 3278-2 terminal and replace it with the Apple/converter combination or run a new coaxial cable from the controller.

To connect up to seven Apples to a mainframe through a single connection, Apple also sells the Apple Cluster Controller. This box looks like a standard IBM 3274 or 3276 cluster controller for the IBM network, but provides ports for the more than half-dozen Apples. As with Appleline, the computers can hook directly to the cluster controller or link up via a modem.

For the Apple II family, you can choose a more customized solution. The Apple Communications Protocol Card drops into a II, II Plus, or IIe, and emulates an IBM 3274 Cluster Controller connected to a 3278 Display. With the right software (see "David Talks to Goliath" on page 45), it can also let your Apple II act like a 2780/3780 Remote Job Entry Terminal from IBM.

**Lost in the Translation**

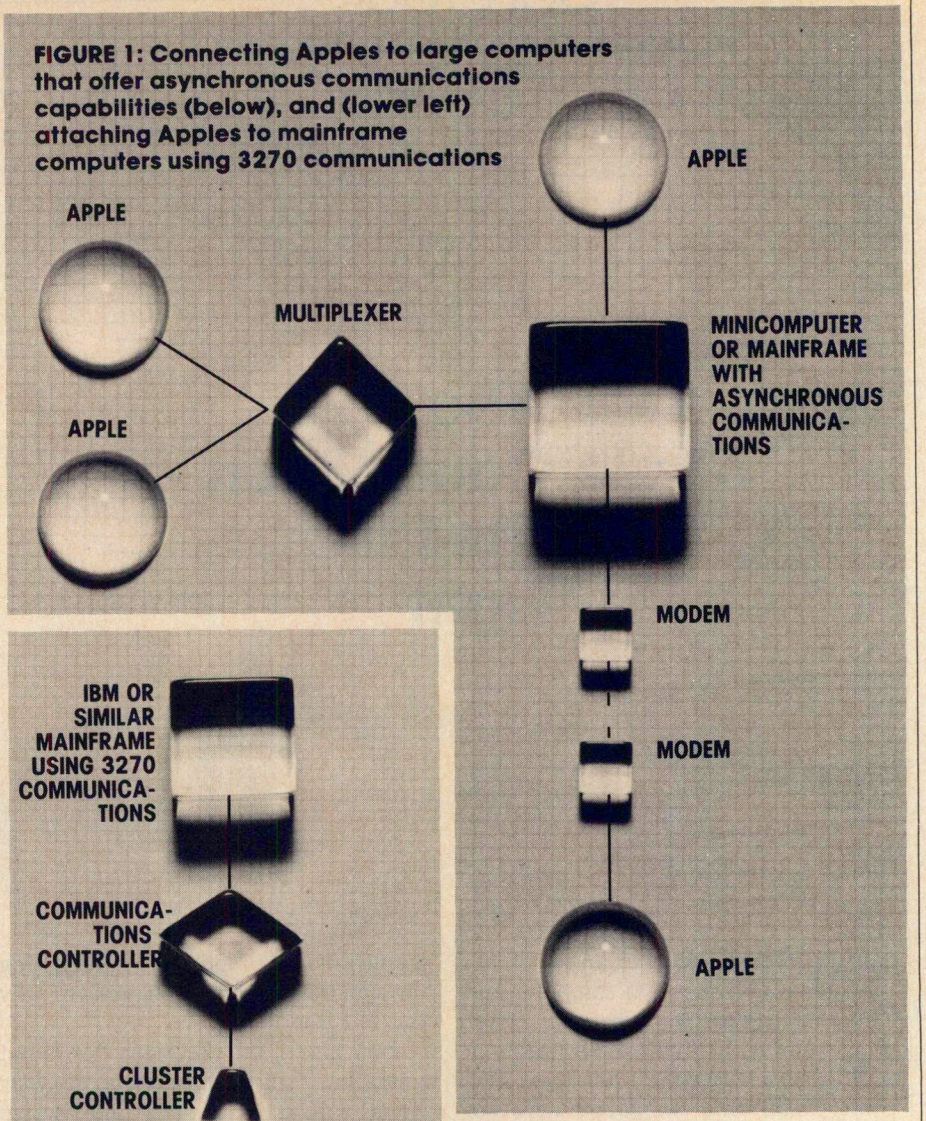
Although the converter forms an excellent electronic bridge from the Apple's serial port to the 3270 controller, you still notice some differences from normal Apple use. The most serious problem is screen size: Apples normally show a maximum of 24 lines of text, whereas terminals such as the 3278 show 25 lines, in addition to a set of status lights. Most mainframe terminals also have larger keyboards, so you have to simulate the operation of their extra keys with keystroke combinations or mouse selections.

So far, converters for the Apple do not offer a solution to the problem of screen size. Some companies are working on ways to use the Apples' graphics abilities to show all 25 lines, and these products should start appearing in about six months. For now, you'll have to do without the extra line or reprogram your mainframe applications to work within the top 23 or 24 lines. On the Macintosh and Lisa, software now in development will use the Graphics mode of these machines to display more lines per screen.

The keystroke problem is not as severe. You can pick from a pull-down video keyboard on the Macintosh and Lisa for the extra keys. If you're using an Avatar PA 1000E, Winterhalter DataTalker, or Appleline with the Apple III and Access 3270, you invoke the operations with short sequences of keys.

Although the converters do an excellent job of simulating terminals in the interactive mode, current models do not provide a particularly good method for file transfer. Typically, the converter puts a screen's worth of data into a buffer (because the 3278 sends and receives an occasional block of data at

**FIGURE 1: Connecting Apples to large computers that offer asynchronous communications capabilities (below), and (lower left) attaching Apples to mainframe computers using 3270 communications**



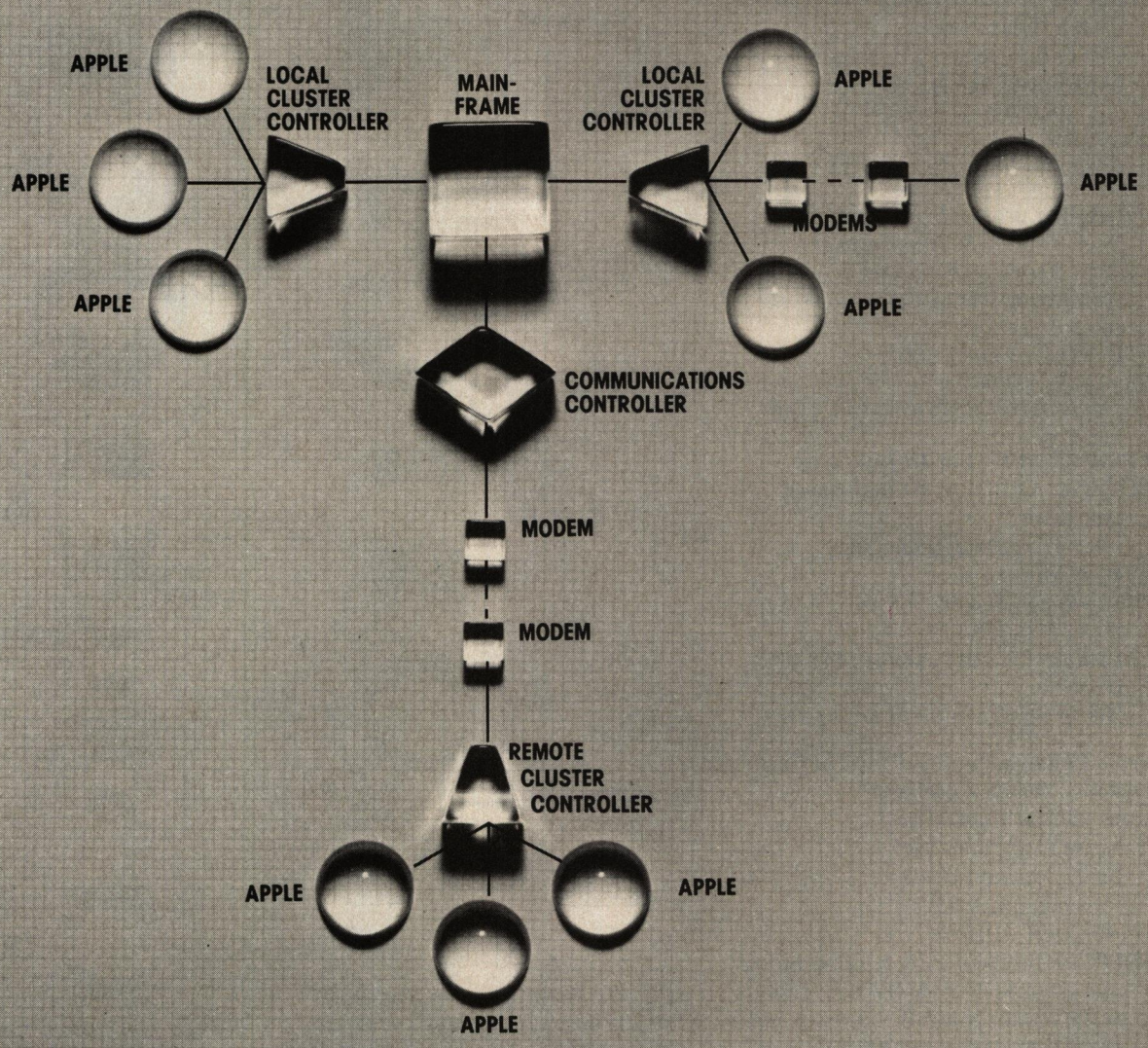
## ▸ THE 3270 SPEAKS A DIFFERENT LANGUAGE

The IBM 3270 series includes a wide range of communications controllers, terminals, and remote printing stations. The terminals generally are grouped in clusters attached to a communications controller, with the controller, in turn, attached to the mainframe (see figure 2). Ordinary asynchronous terminals send data out whenever you enter a keystroke, but 3270-series terminals save their data and wait for a request directed specifically to a particular terminal to dump one or more screens of data out to the controller. This method of transmission, called polling, allows several terminals to share the same connecting line.

The 3270 products also regulate their communication differently than ordinary dial-up ports do. Rather than using the asynchronous method (in which each character is sent with a synchronizing start bit and stop bit but nothing is done to maintain timing between characters), 3270-series products link up by using IBM's Bisynchronous or Synchronous Data Link Control (referred to as bisync or BSC and SDLC respectively). These communications protocols also provide a more complex error-checking method and addressing capability than do the simpler methods used in the personal-computer world.

Protocol differences may seem a bit arcane if you're not a communications expert, but the differences in character sets are visible. The character code that the mainframe sends out for each letter produces a different character symbol on the Apple screen. The IBM mainframe world uses the character code EBCDIC; Apples, other personal computers, terminals, and minicomputers use ASCII. The code that a mainframe sends out for the letter *Z*, for example, corresponds to an inverse-video closing-parenthesis symbol on the Apple. EBCDIC uses 256 code combinations rather than ASCII's 128, so you can't get a one-to-one translation between codes. Along with symbols that ASCII lacks, such as the ¢ sign, EBCDIC has a richer set of communications- and terminal-control characters.

***FIGURE 2:*** **Examples of connecting Apples to mainframes using local and remote cluster controllers**



high speed—the Apple, on the other hand, sends and receives data character by character). If you have to save larger data files from the mainframe, the Apple computer must do the saving.

Unfortunately, Macterm and Lisaterm, for example, do not yet have a method for saving screens of data that don't scroll—most 3278 programs erase and repaint the screen instead of scrolling. You can save single screens of data with the Copy to Clipboard or Scrapbook functions, but this method is not viable for capturing long files.

Mainframe-to-Apple communications, however, is still in its infancy. Both Apple and independent vendors are continuously improving their interconnection software and hardware, with ease of use apparently a priority. As they gain more experience in speaking mainframe, Apples will begin to sound more like natives. +

## ▸ SEND IT BY TAPE

If you need to exchange large volumes of data between Apples and mainframes but don't need immediate interaction with the mainframe programs, you may be best off hooking your Apple to an off-line tape drive. Virtually all mainframe systems can read from and write to open-reel ½-inch magnetic tape ("mag tape") quickly and efficiently. Tying up a mainframe communications port can be costly and time-consuming. Instead, you can hook the Apple to a suitable tape drive, type in all your data, and then mount the tape on the mainframe. This approach is a low-cost, high-speed method of transferring data. For example, it takes several weeks to upload about 5 megabytes of data from an Apple to an IBM 3083 mainframe if you use a modem and a phone hook-up. In contrast, you can upload the same amount of data to the mainframe in one afternoon with a tape drive. Also, each tape can store 20 megabytes or more.

Finding Apple-to-mag-tape hardware is the easiest part. Companies such as Innovative Data Technology in San Diego, California, sell a variety of tape drives, complete with interfaces for all of the Apple computers.

The core set of device-driver routines comes built into the interface, so you won't have to teach your Apple how to start and stop the transport mechanism or what to do with input data. You will have to write some software on your own to arrange your data in a suitable format for the type of mainframe you plan to use, however.

If you go this route, expect to pay between $3000 and $10,000 for your tape drive and interface, and additional money for custom software.

## ▸ PRODUCT INFORMATION

**Avatar PA 1000E protocol converter**
Avatar Technologies
99 South Street
Hopkinton, MA 01748
(617) 435-6872
**List Price:** $1095
CIRCLE 516 ON READER SERVICE CARD

**DataTalker protocol converter**
Winterhalter & Associates
3853 Research Park Drive
Ann Arbor, MI 48106
(800) 321-7785
In MI (313) 662-2002
**List Price:** $1095
CIRCLE 517 ON READER SERVICE CARD

**TD-1012/APP-II or III tape drive**
**TD-1054/APP-II or III high-speed tape drive**
Innovative Data Technology
4060 Morena Blvd.
San Diego, CA 92117
(619) 270-3990
**List Price:** TD-1012, $4995; TD-1054, $6995.
CIRCLE 518 ON READER SERVICE CARD

**Apple Communications Protocol Card**
**Appleline protocol converter**
**Apple Cluster Controller**
Apple Computer, Inc.
20525 Mariani Blvd.
Cupertino, CA 95014
(408) 996-1010
**List Price:** protocol card, $700; protocol converter, $1295; three-port version of the cluster controller, $4500; and seven-port version, $7000
CIRCLE 519 ON READER SERVICE CARD

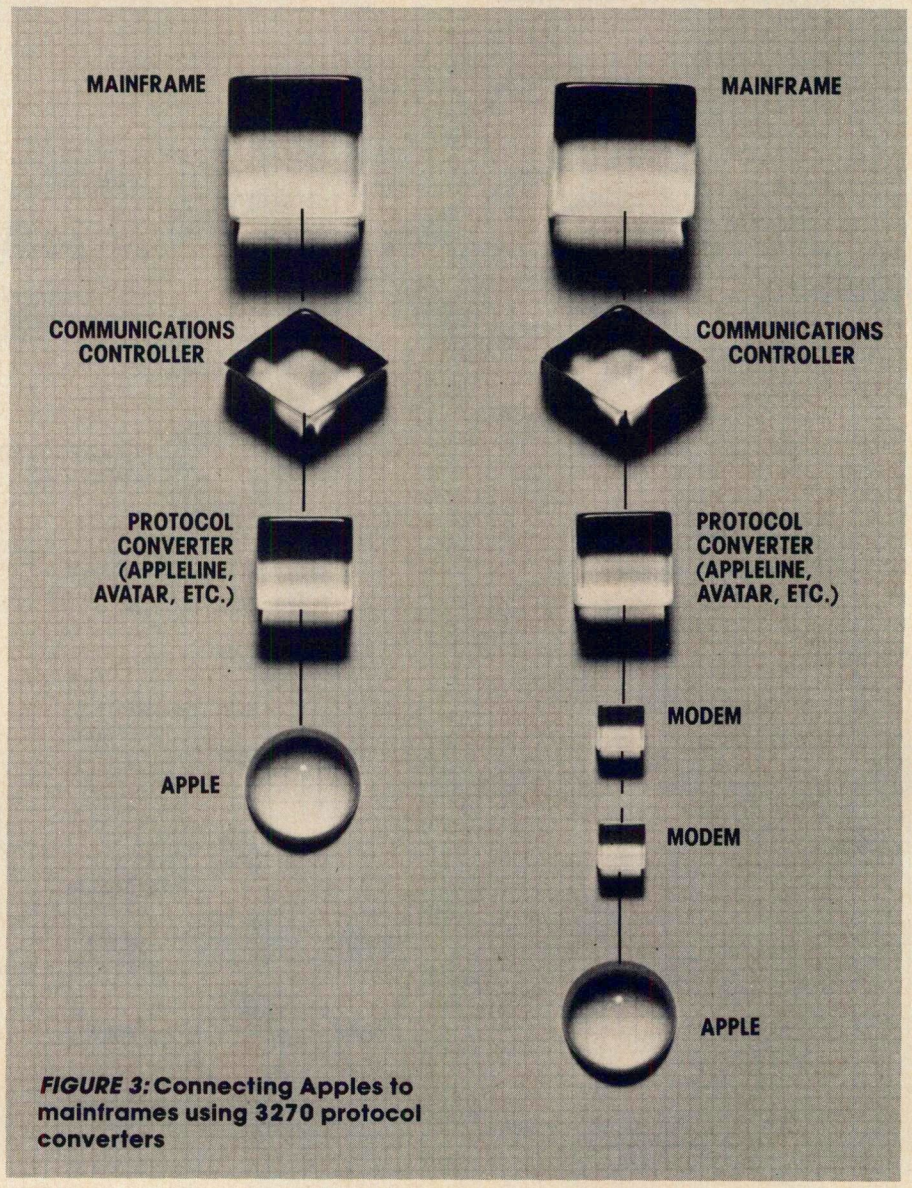
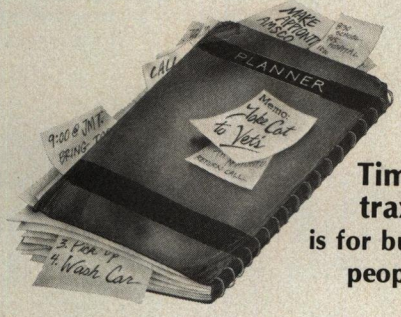



***FIGURE 3:*** **Connecting Apples to mainframes using 3270 protocol converters**

# Suzie's First Softball Game. . . The Two Places-At-Once Schedule . . .Meeting With The Boss.

# Time-trax™ Would Have Remembered.

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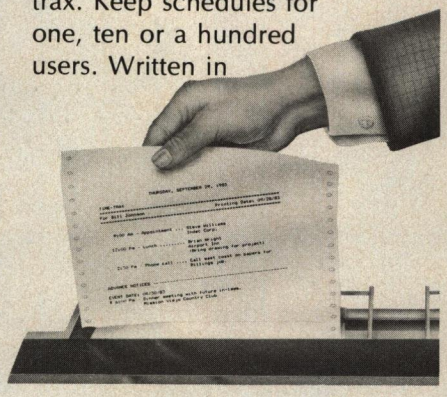
Busy people everywhere need Time-trax. Keep schedules for one, ten or a hundred users. Written in



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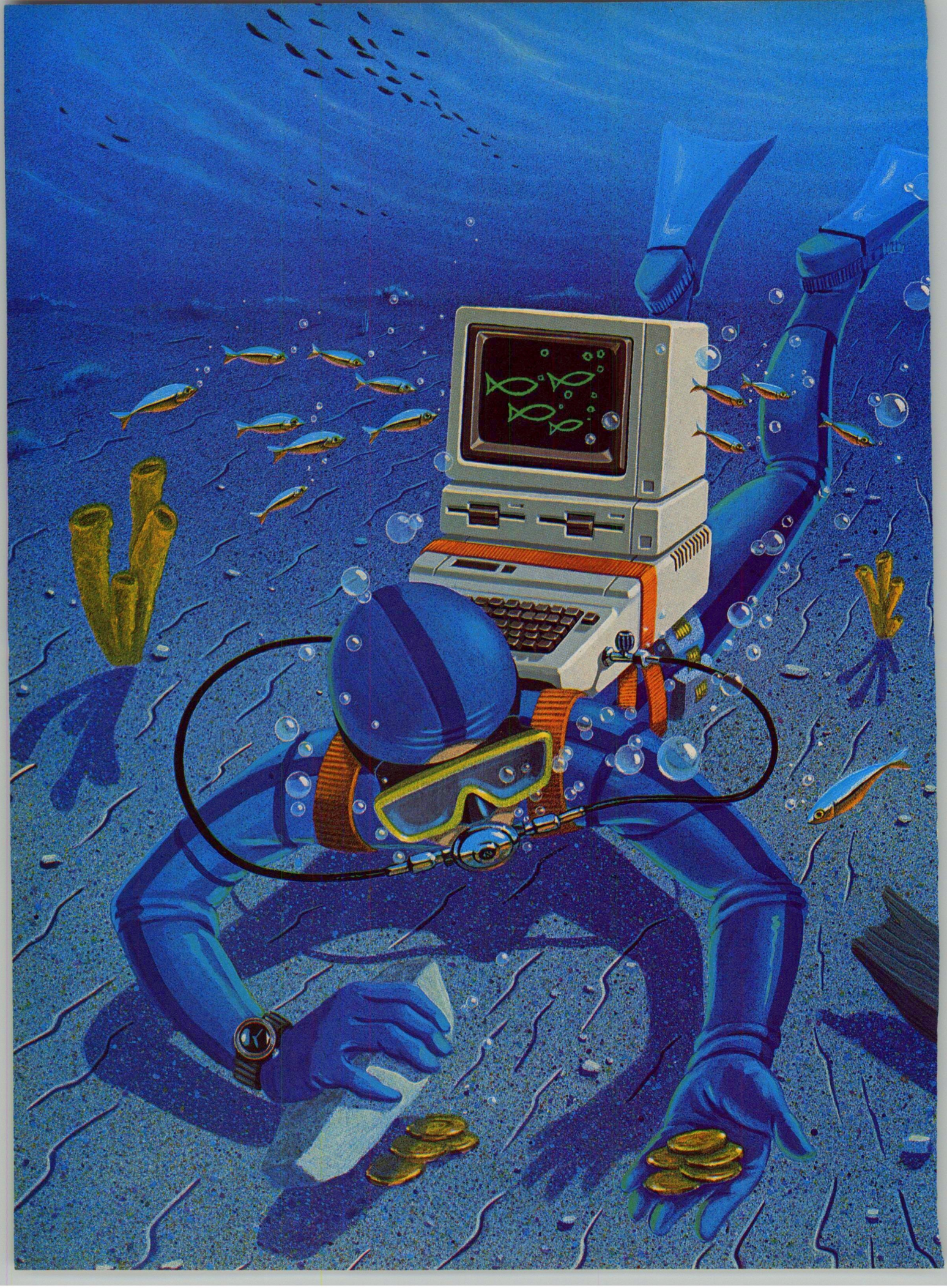
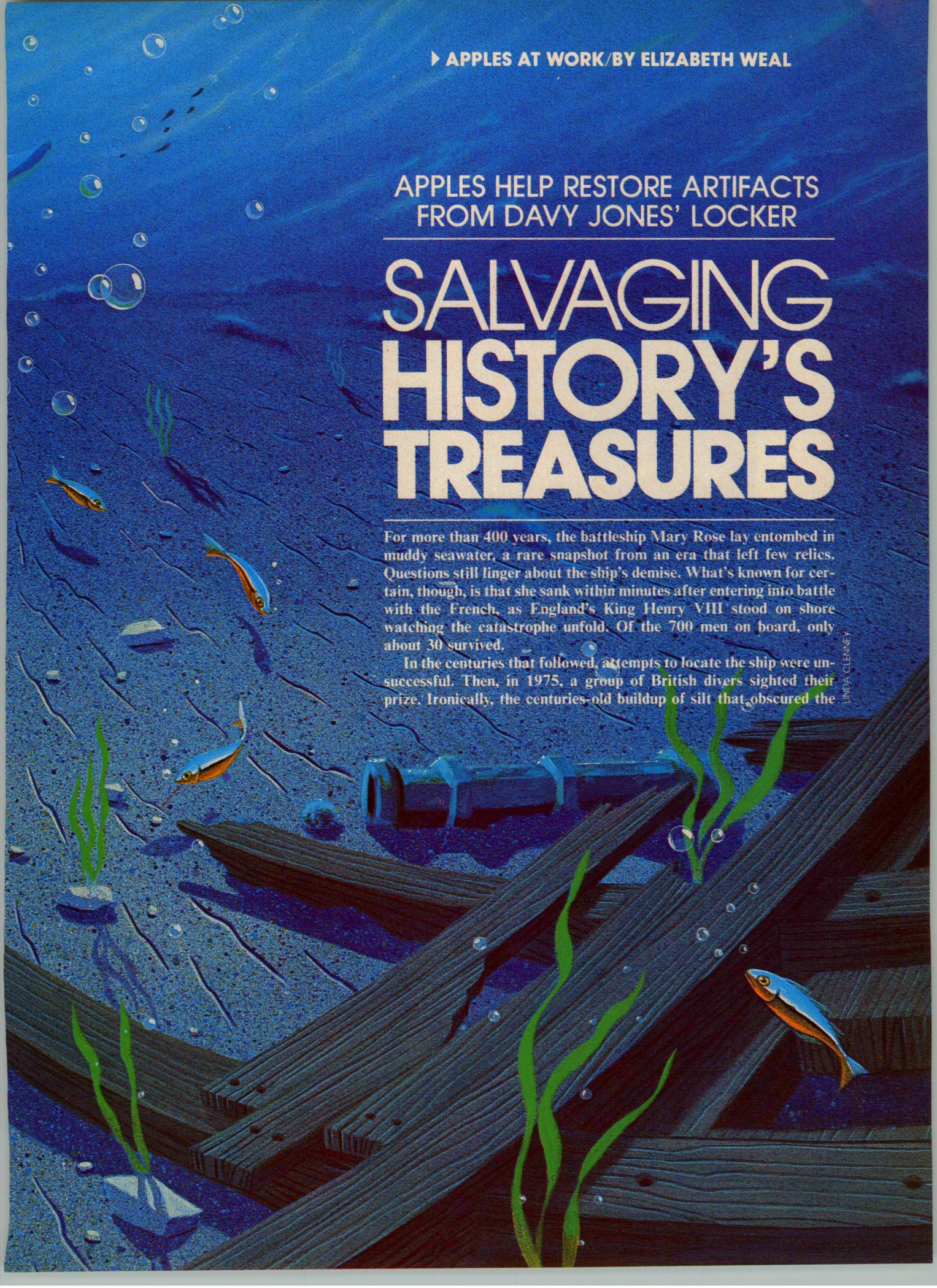


## APPLES HELP RESTORE ARTIFACTS FROM DAVY JONES' LOCKER

# SALVAGING HISTORY'S TREASURES

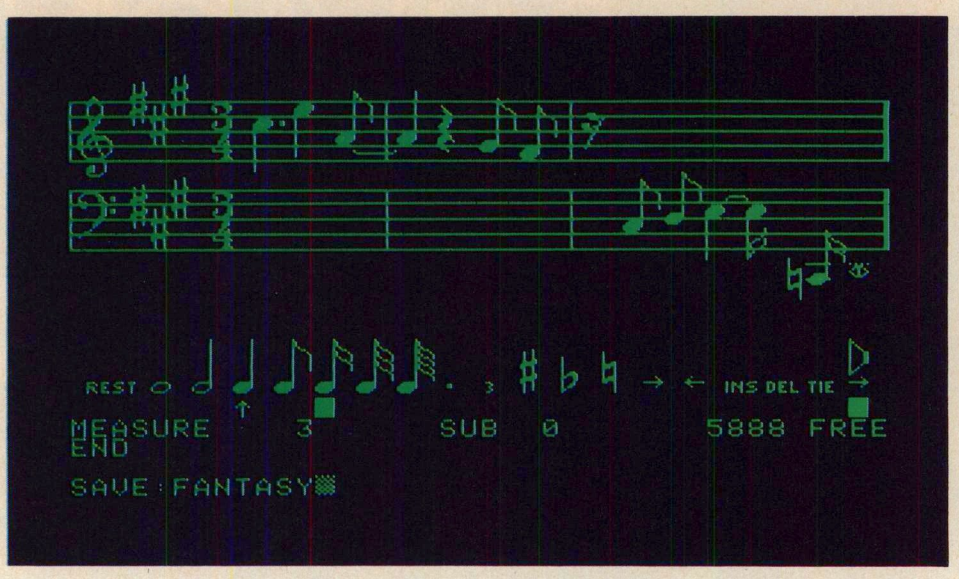


LINDA CLENNEY

**For more than 400 years, the battleship Mary Rose lay entombed in muddy seawater, a rare snapshot from an era that left few relics. Questions still linger about the ship's demise. What's known for certain, though, is that she sank within minutes after entering into battle with the French, as England's King Henry VIII stood on shore watching the catastrophe unfold. Of the 700 men on board, only about 30 survived.**

**In the centuries that followed, attempts to locate the ship were unsuccessful. Then, in 1975, a group of British divers sighted their prize. Ironically, the centuries-old buildup of silt that obscured the**

# INSTANT FUN.

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But now the *real* fun begins. Use the Music Entry program to put in your own songs. Just match the symbols in the sheet music with the ones on the screen. Or make up your own songs—each note is played as you put it in. Changing notes, inserting new notes, and deleting extras is a breeze. Editing is so fast and easy you'll be adding frills just for kicks.

The Music Card goes beyond having a good time. Even professional musicians love its advanced abilities. Change volume, timbre, and tempo at any point in the music. Triplets, quintuplets, sixty-fourth notes and faster? No problem. Rounds, repeats, D.C. al Fine, al Segno, al Segno e poi la Coda... any repetition you can imagine is simple. Transposition in quarter-steps. Full ADSR envelopes. The Music Card does it all.

So pour some music in your Apple. $169 at your Apple dealer, or call 1-800-321-4668 (in Colorado, 1-303-234-0871). And start having fun. Instantly!

The Music Card model MC1 plugs in your Apple //, //+, //e, or ///. Game paddles required for the // and //+, recommended for the //e. "Apple" is a trademark of Apple Computer.

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vessel had preserved the objects within in a remarkably pristine state.

The continued preservation of these artifacts—some 17,000 in total—has proved to be a mammoth task, however. According to Howard Murray, one of five conservators on the project, the quantity of articles recovered from the Mary Rose far exceeds that of previous similar finds. To help streamline the tedious and sometimes imprecise preservation effort, Murray has called on VisiCalc, running on an Apple II Plus, to predict how various objects can best be saved.

PEAS STILL IN THEIR PODS TESTIFY TO THE EXTRAORDINARY CONDITIONS IN WHICH THIS STOREHOUSE OF GOODS REPOSED.

Preserving the artifacts is crucial to historians and archaeologists because they provide clues to a relatively undocumented era in naval history. The objects include not only military implements—wrought-iron guns, longbows, and arrows—but also relics of the seamen's daily routine—a backgammon game; pocket sundial; bone manicure set; and the barber-surgeon's chest, complete with drug flasks, razors, and pewter bowl for bloodletting. Peas still in their pods testify to the extraordinary conditions in which this storehouse of goods reposed for so many years.

**Freeze-Dried Preservation**

Within their mud cocoons, these objects are 80 to 90% water. They will disintegrate if, to clean them, they're immersed in a tub of water. Lay them out to dry, and they'll collapse, without mud and silt to support them. The conservators' mission, therefore, is to safely dry each object without sacrificing its original shape.

The recovered objects are first treated with wax. Next they are frozen and placed in the freeze-dryer, an 8 × 1½-foot vacuum chamber, where heat is applied. Freezing turns the water inside the objects to ice; heating causes the ice to escape in the form of water vapor. Before the advent of freeze-drying, it took years—three, four, even five—to dry water-logged objects.

The primary drawback of this approach is that it's not automated. The time each object spends in the freeze-dryer (anywhere from two weeks to two months), the optimum temperature and pressure inside the chamber, and the quantity of stabilizing chemicals (wax and a sugar alcohol), vary according to what the object is made of, its dimensions, and the amount of water it contains. The conservators' current strategy is to rely on intuition and experience to determine each object's freeze-drying regime, but their plan is to use an Apple II Plus to inject more precision into the process.

**Apples Join the Preservation Team**

Specifically, the Mary Rose Trust in Portsmouth, England, has contracted with a local software developer to assist with a VisiCalc model that utilizes data obtained from objects that already have been preserved, in order to predict the freeze-drying requirements of objects not yet dried. Based on an object's dimensions, composition, and level of saturation, the program computes the amount of time the object should be dried, the temperature and pressure at which it should be dried, its weight after drying, and the quantity of chemicals required.

Because there have been few freeze-drying operations of this magnitude in the past, and because it is impossible to simulate the effects of four centuries under water, Murray did not have a lot of past data to go on. Only after conservators had gathered data on some 2000 articles could work on the model begin. Now in the final stages of development, the model will run on a 64K Apple II Plus with a Pascal language card, two disk drives, and an Epson MX-100 printer.

YOU CAN ALWAYS DISPOSE OF A BATCH OF DEFECTIVE FREEZE-DRIED COFFEE—NOT SO WITH A STEERING COMPASS FROM THE TUDOR PERIOD.

Perhaps the most significant benefit of the VisiCalc model is that it will take much of the guesswork out of freeze-drying. Now the subtleties surrounding how a certain type of wood behaves, or the most effective way to dry a particular shape, are buried in the conservators' personal stash of knowledge.

Once the model is complete, almost anyone can learn the requisite techniques. In addition, the software will cut expenses by enabling conservators to predict more accurately the quantities of chemicals needed during the process. Eventually, Murray plans to make the program available to other conservation teams.

Freeze-drying on a commercial basis has been around for a long time, but that process requires far less precision than freeze-drying one-of-a-kind artifacts. You can always dispose of a batch of defective freeze-dried coffee—not so with a steering compass from the Tudor period.

The current system, even using the modeling program, is not foolproof; occasionally objects melt. The cause, according to Murray, is that the temperature cannot be varied within the freeze-drying chamber. Since it takes a lot more heat to dry a large object than a small one, small objects can easily get overheated.

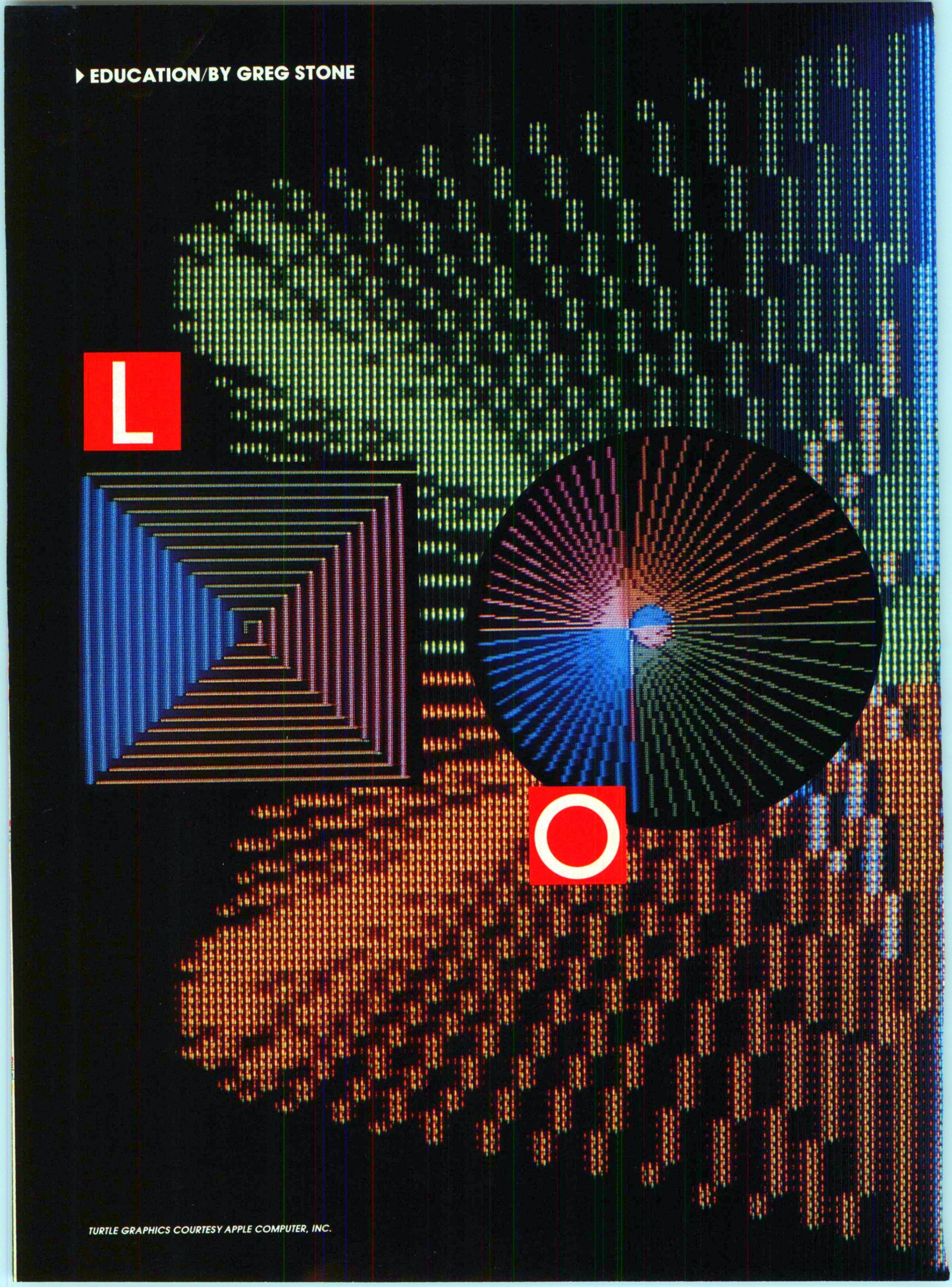
In order to solve the problem, conservators are developing a system that uses the Apple II Plus to control equipment within the freeze-dryer—specifically, infrared lamps to regulate temperature and baffles to obstruct the release of water vapor. The equipment is in place. The final step is building the interface.

In addition to its important role in the conservation lab, the Apple has been put to work in the Mary Rose Trust's accounting department. The financial staff there keeps track of the organization's finances with Jarman, an accounting package which was created in Great Britain, and uses Multiplan to assist in creating fund-raising strategies.

The Apple is certainly not the only high-tech participant in the Mary Rose salvaging effort: The sonar that helped locate the ship, the light-amplification cameras that made it possible to photograph the underwater wreck, and the sophisticated lifting gear that raised the hull, all played a role.

Obviously, in the future, technology will play a larger and larger role in unraveling enigmas of the past. As one Mary Rose official put it, "Without the use of high technology, it never would have happened." +

▸ EDUCATION/BY GREG STONE




*TURTLE GRAPHICS COURTESY APPLE COMPUTER, INC.*

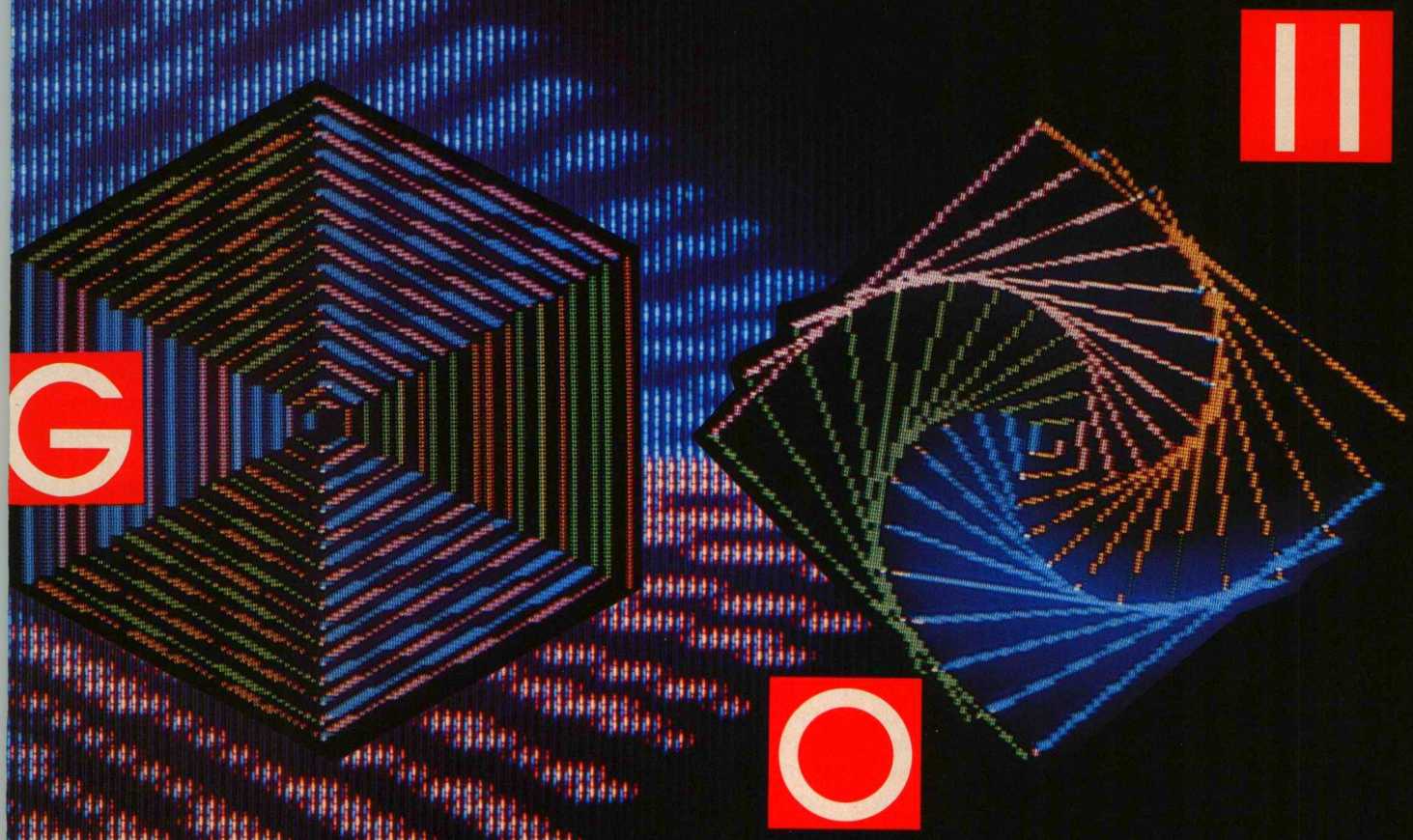
# APPLE LOGO II

## A new version of Logo provides help for beginners and additional features for advanced users.

If you haven't used Logo, you'll find Apple Logo II an easy-to-learn version of this programming language, replete with all the turtle graphics and list-processing commands that make Logo both fun and powerful.

If you've been using Apple Logo—or any other Logo designed for an Apple with 64K RAM—you'll find Apple Logo II a pleasant surprise, with more than twice the user memory space, many new commands (in Logo, these are known as primitives), and the ability to create data files on disk. (You'll need an Apple IIe with 128K RAM or an Apple IIc to use it, though.)

The new versions of Logo that have come out in the past year for the IBM PC might have tempted you to swap your Apple, but forget it. Each new package has advantages and disadvantages, but Apple Logo II holds its own with the various versions of Logo now available for the IBM PC.




**What Is Logo?**

This programming language stands with one foot in the educational philosophy of Jean Piaget and the other in LISP, the language of choice for most artificial-intelligence research. During the past two decades it has emerged from these two traditions, migrating from huge mainframes to minis and, in the past few years, to microcomputers. It is best known for its turtle graphics, but Logo also includes list-processing capabilities that make possible the creation of sophisticated programs such as database managers, word processors, and even expert systems.

Educators have used Logo with preschoolers, beginning engineering students, and senior citizens. Their motives are mixed—to introduce computer programming, to teach creative thinking, to familiarize students with geometry. Families find exploring Logo an activity everyone can participate in, regardless of age or

computer knowledge. For more information on Logo programming, see "Follow the Turtle to Logo," by Steve Rosenthal in *A+*, Volume 1, Issue 2. The Logo educational philosophy is covered in detail in A. Richard Immel's interview with Seymour Papert, (known as the "father of Logo"), in *A+*, Volume 1, Issue 1.

**The Language**

As with other computer languages, Logo includes a vocabulary of primitive commands and various structural conventions. You can learn the fundamentals of the language while using turtle graphics, a portion of Logo that allows users to draw simple and complex designs on a screen with surprisingly few commands. The Logo "turtle" is nothing more than a small triangle that follows commands. If you type FORWARD 50, for example, the turtle moves forward 50 steps (about two inches), leaving a line of this length on the screen.

In Logo, such commands are grouped together to form "procedures." For example, you can build a procedure called Square out of several commands, telling the turtle first to move forward 50 steps, then turn right 90 degrees, then move forward 50, and so on. If we have defined a procedure called Square and another procedure called Triangle, we can place the two together in a program called House. (That is, if we have been clever enough to make sure that in the drawing the triangle lands on top of the square so it looks like a roof!)

**A Helping Hand**

As the beginner moves into more complex tasks, Logo's real power emerges, although at the price of greater difficulty.

Logo is known as an easy language to learn, and Apple Logo II has made it even easier with several new aids. These aids include a tutorial disk, two Help screens, and debugging primitives. (Users also receive a 325-page reference manual and a 177-page book, *An Introduction to Programming*.)

The tutorial disk leads you through the basics of turtle graphics, variables, and a few word-oriented commands. It's a well-executed interactive program that makes use of two on-screen personalities, an anonymous instructor, and a zealous gadfly called Leo Logolover. Having two instructors with different personalities adds zest to the instructional activity.

The first Help screen gives basic graphic commands, as well as some other essential information such as how to start a program or get into the Logo text editor. The second Help screen appears if you ask for help while editing text and gives information about text-editor keystrokes.

Finally, typing HELP—followed by the name of any Logo primitive—serves as a memory jogger, displaying the inputs required by that primitive. (Programmers can also create their own Help screens within Logo.)

**Step and Trace**

These two Logo primitives help debug a program. Step causes a program to execute one line at a time, showing both the program line and the result (action) caused by the line. Trace prints tracing information when you execute a program, showing, for example, the depth of a recursion or the order in which various subprocedures are called. The usefulness of such features becomes evident as Logo programming skills increase.

THE IMPROVED APPLE LOGO IS A TRUE VALUE AS AN INITIAL PURCHASE OR AS AN UPGRADE.

You can add features such as Step and Trace to other versions of the language by writing procedures that carry out these activities. That's part of Logo's charm—the language is limited only by your ability. You can give each new procedure that you write a one-word name and use it in other procedures, just as if it were a primitive.

**Good News**

Apple Logo users who are familiar with those frustrating "out of space" messages will welcome Apple Logo II. Apple Logo doesn't take advantage of an Apple IIe with 128K RAM, but Apple Logo II does. Instead of about 2819 nodes of user memory, you'll find 7179. Perhaps more important, Apple Logo II lets users create data files on disk. In Apple Logo, one Save command saves the entire Logo "workspace." It doesn't matter that all you want saved are the scores of a race, or perhaps the subtotals and total in a checkbook program. Type SAVE, and everything—the entire program and all associated variables—goes onto the disk.

This is a cumbersome way to do business. With Apple Logo II, you can have your program open a file, write to that file, and close it. Later, you can read the file and use the information in another program, or in another portion of the same program. Features such as this take Logo beyond the classroom and make it a serious programming tool for whatever task you have in mind.

**Highlights**

In all, about 200 primitives comprise the vocabulary of Apple Logo II, and, of these, more than 50 are additions that can't be found in Apple Logo. It's impossible to cover all of them, but here are some highlights:

CALL calls a specified machine-language subroutine.

DRIBBLE sends to the disk or printer a copy of everything that appears on the screen. Logo encourages an exploratory programming style, and this command is a great way to keep track of where you've been and where you're going.

FILL is a significant improvement to turtle graphics. Place the turtle inside a closed area, type FILL, and the area fills with the turtle's current pen color. (If the turtle isn't enclosed, the background is filled.)

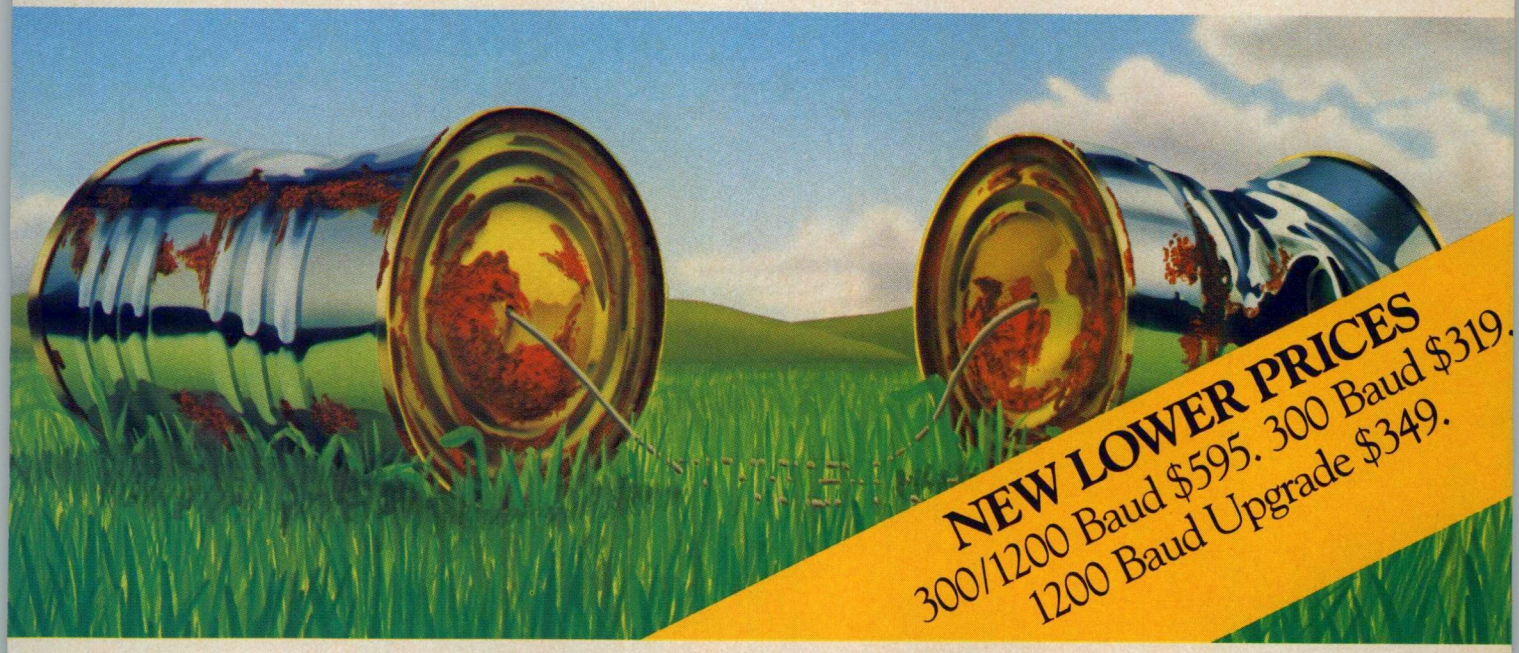
LOADPIC enables you to save to disk—and quickly recall—the pictures you create with turtle graphics. Thus, you can include graphic images in a program without going through the painstakingly slow process of having the turtle redraw the picture.

LOWERCASE changes a word to all-lowercase letters. Yes, there's an UPPERCASE primitive, too.

PRINTPIC is a screen dump to the printer. Although instructions warn that results are unpredictable with printers other than the Apple Imagewriter, I found it worked fine with Apple's new Scribe printer.

READWORD is similar to READLIST, but it outputs the material read as a Logo word rather than as a list. The entire family of read commands

# NOVATION

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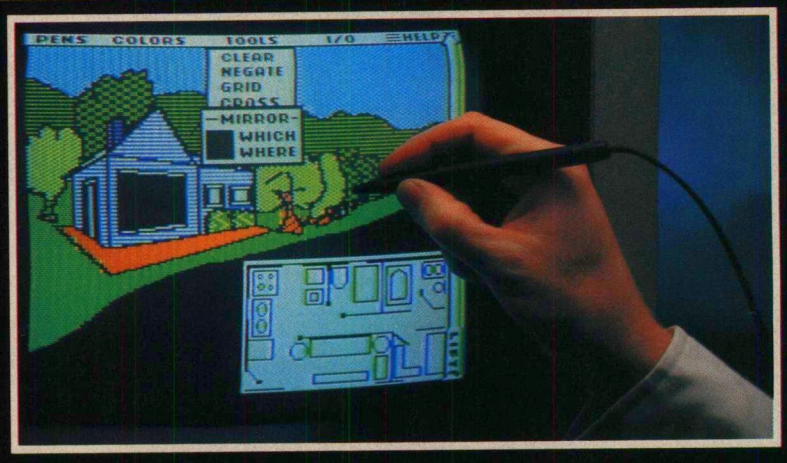


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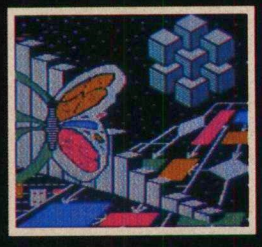

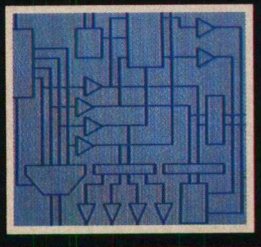

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has been enhanced by allowing them to read from a file as well as from the keyboard.

SAVEL is similar to SAVE, except that it allows users to list specific procedures and variables to be saved. (With SAVE, the entire workspace is saved.)

TOOT generates a tone of a specified frequency for a specified duration. For example, if you wanted a middle C to last one second, you would type TOOT 262 60.

**Wish List**

All Logo users have their own "wish list" of special features. Some things I would have liked to have found in Apple Logo II, but didn't, are:

1. An editor that gives users the choice of using special keys—such as the open-apple and cursor-movement keys—or the old control-key sequences. Some of us are used to the control keys. In other instances, schools may have both Apple II Plus and IIe computers; and it would be easier if children learned just one editor to use on both machines, even if that editor were the more difficult, older version with control codes.
2. More colors. Logo II still uses black, white, green, violet, orange, and blue. As other programs have demonstrated, there are ways to simulate more colors on the Apple II.
3. More list-processing primitives. DR Logo (developed by Digital Research) provides primitives for shuffling and sorting lists, for example.

**Value and Versatility**

Admittedly, these quibbles aren't entirely fair. Logo Computer Systems, Inc., which developed the original Apple Logo—as well as IBM's Logo—has delivered to Apple a language that is amazingly versatile and still leaves users plenty of work space.

At its list price of $99.95, the improved Apple Logo II is a true value as an initial purchase or as an upgrade from Apple Logo. ✚

## PRODUCT INFORMATION

**Apple Logo II**
Apple Computer, Inc.
20525 Mariani Avenue
Cupertino, CA 95014
(408) 996-1010

**List Price:** $99.95

**Requires:** Apple IIc or IIe with extended 80-column card; one disk drive

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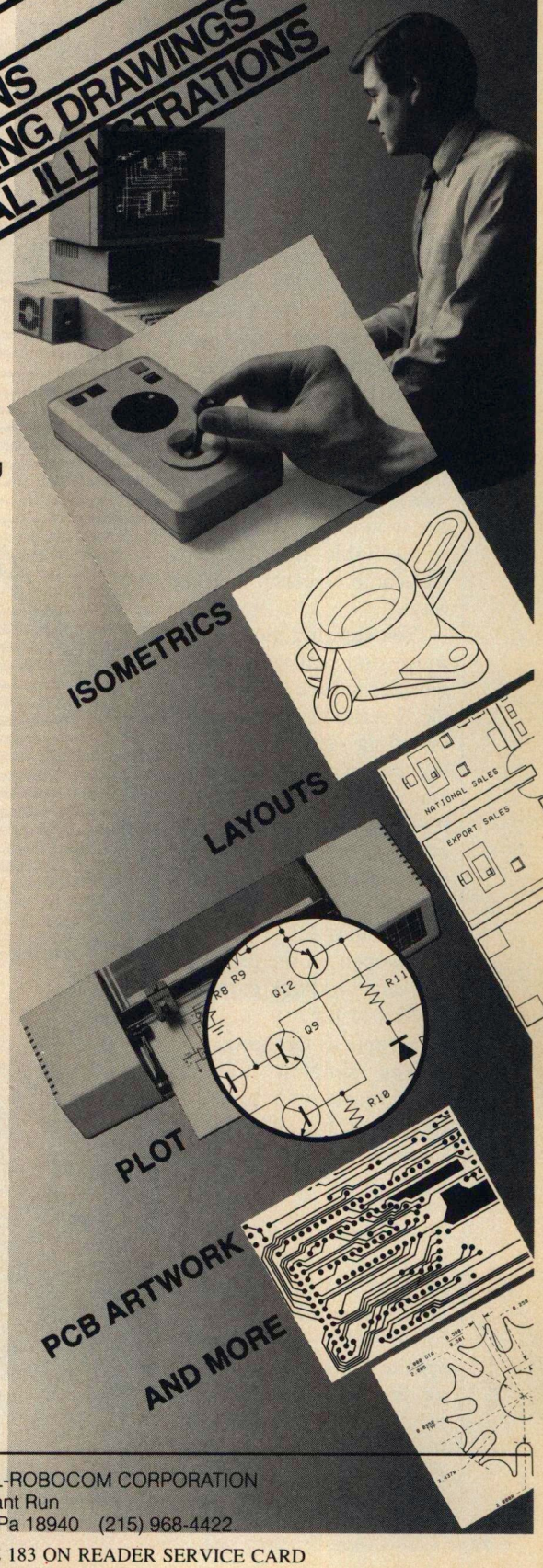


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YOU CAN ORCHESTRATE A PARTNERSHIP BETWEEN YOUR APPLE AND A VARIETY OF HARDWARE AND SOFTWARE, WITH HARMONIOUS RESULTS.

Computers and music have a special affinity, because they speak different dialects of the same language, mathematics. (In fact, music *is* math, of a special sort, a mathematics made up of the relationships of pitches and units of time.) As personal computers become common in everyday life, it is inevitable that the two will come together in a big way.

You can find more hardware and software of a musical nature for the Apple II series of computers—including systems for making music, transcribing it, analyzing it, and marketing it—than you can for any other personal computer on the market today. Most of it is good. Some of it is extraordinary.

So open up the grab bag and dig in. Your ears will thank you for it.

**The Apple as Orchestra**

The simplest way to make music with your Apple is to use its built-in speaker. Several programs are available that allow you to write simple scores (either in musical notation or as strings of numbers) and play them back without external amplification. Unfortunately, the Apple's speaker was designed with games, rather than music, in mind, and it sounds like it. Even programs such as Paul Lutus' Electric Duet, which manages to trick the

# NDS

speaker into creating two-note chords, can't make it sound like more than a toy.

To do that, you've got to upgrade your system by installing one of several oscillator cards: the Mockingboard, the ALF, the Super Music Synthesizer, the MX-5, or the MusicSystem. All of these products plug into some form of outside amplifier, such as the receiver in your home stereo, which allows their sounds to emanate from much better speakers.

The Mockingboard oscillator card, from Sweet Micro Systems, makes its best music in tandem with a program from Electronic Arts called Music Construction Set. Together they can generate chords of up to six notes. The program itself gives you a visual representation of a grand staff, on which you can write and rearrange music, using a joystick, a KoalaPad, or the computer keyboard itself. It's an excellent teaching tool and a lot of fun. Making music becomes a game.

Much the same holds for the ALF digital-oscillator card, manufactured by ALF Products; the Super Music Synthesizer from Applied Engineering; and the Mountain Computer MusicSystem. Though they have more "voices" than the Mockingboard (16 as opposed to 6, allowing them to play more simultaneous notes) and more control over the timbre (tone color) of the sounds they create, their individual software packages allow you to enter notes only from the computer keyboard or a game-type peripheral controller. This process can be both laborious and frustrating. If you're serious about your music and not a masochist, these packages will wear you out. You would do well to take one more step on the upgrade ladder and turn your Apple into a true musical instrument, with

VICTOR BUDNIK

either the Syntauri or the Soundchaser digital-synthesizer package.

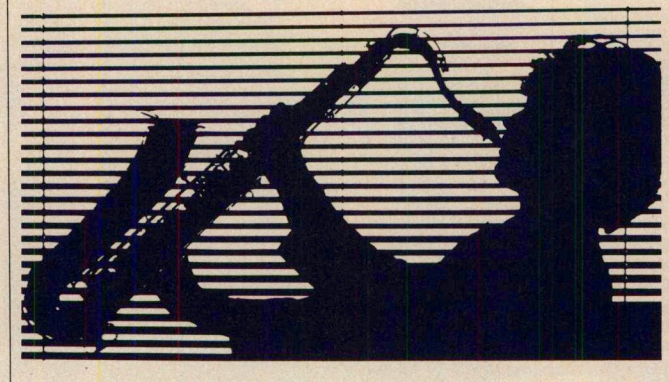
**The Big Two**

Both the Syntauri, from the Syntauri Corporation, and the Soundchaser, from Passport Designs, started out several years ago as attempts to crack the professional musical-instrument marketplace. The idea was to take an existing package—the Apple equipped with the two peripheral cards that make up the Mountain Computer MusicSystem—and provide a new operating system based on more powerful software and an actual piano-like keyboard. For the first time, the Apple became a true instrument, something that people could play in real time.

The two products are superficially similar. Each can play up to eight notes at a time (a limit that results from the fact that each note comprises two oscillator "voices," which makes the sound thicker and more interesting). Each comes with your choice of a four- or a five-octave keyboard, and each has a wide range of software, running the gamut from educational packages to multitrack-recording emulators. There are differences between the two systems, however, and you should choose the one you prefer based on careful thought about whether or not it will meet your needs.

For example, the standard versions of both systems take up three peripheral slots—two for the MusicSystem cards, and one for a keyboard interface. Not everyone has that many slots available, however. You may prefer to go with the new Soundchaser MX-5 card, which takes up only one slot and has everything on it, including a keyboard-control interface. (The drawback here is that the card draws a great deal of power through its one slot, reportedly enough that it *can* stress your system and cause other applications in your Apple to malfunction. I encountered no such problem while testing—but everyone's computer is slightly different, so I recommend caution.)

Another difference is in the programs that both companies offer for analyzing what you play on the keyboard and then printing out that music, in standard musical notation, on a dot-matrix printer. Syntauri's Composer's Assistant is ambitious but has some glitches and other drawbacks. Passport's equivalent, Polywriter, is less glamorous in intent but far more functional.



**For the first time, the Apple became a true instrument, something that people could play in real time.**

If you want your compositions in sheet-music form, then the Soundchaser is your better choice. On the other hand, if you are interested in creating exotic sounds and recording music with your Apple, then you may well prefer the Syntauri, because it offers more flexibility of timbral control and a wider range of operating systems.

Syntauri's latest packages are called Simply Music and Musicland. The first is more than it appears to be. On the surface it is a teaching tool, with drills that teach you correct finger placement by having you play notes that match those of prerecorded pieces. The notes to be played are shown on both the keyboard and on the musical staff, using the Apple's high-resolution graphics. Go a little deeper and you find that it is actually an advanced multitrack emulator with which you can record a line of music, play it back, record over it again during playback, play both lines back while recording another line, and so on.

Musicland is ostensibly for kids, but the strongest reaction I've seen to it has been from adults. Developed by Dr. Martin Lamb at the University of Toronto, Musicland is finger painting for the ears. Really. You don't use the keyboard for this one. Instead you use a KoalaPad or a joystick to doodle shapes and colors across a musical staff, letting the computer translate them into music. It isn't standard—but that's OK, because what this package is about is learning to approach the basic components of music, such as melody and timbre, from a whole new angle. Perhaps that's why kids enjoy it but adults go wild; the kids don't get the added pleasure and gleeful freedom that comes from throwing years of Serious Training to the wind.

One distinct advantage that the Syntauri has over the Soundchaser is the existence of two users' groups, one on each coast, dedicated to upgrading and improving the instrument—with or without the manufacturer's help. Both groups have generated an abundance of new software, new sounds, and new applications.

Recent meetings on the East Coast, for example, have included demonstrations of the following innovations: a machine-language program that converts MusicSystem note files into a form that the Syntauri alphaPlus and Metatrak software can handle, allowing you to combine the timing precision of the one with the arranging and timbral possibilities of the other; a set of rack-mounted signal-processing components that can improve the instrument's dynamic range and clarity so that it can hold its own in a recording studio against synthesizers worth five times its price; a program that simulates FM (frequency modulation) synthesis, something usually considered impossible on the MusicSystem cards; and a whole range of alphaPlus and Metatrak modifications and improvements by Russ Streifert, cochairman of the group. In addition, the East Coast group is establishing a monthly diskette-based magazine called *SynDisk*, which will allow Syntauri users who live in other parts of the country to join in the fun and reap the benefits.

**The Apple as Microphone**

Another development of general interest to Apple owners (and of specific interest to Syntauri and Soundchaser players) is the DX-1 card, from Decillionix. The DX-1 does digital sampling.

Sampling? Well, sam-

pling means recording, using a computer's memory instead of magnetic tape.

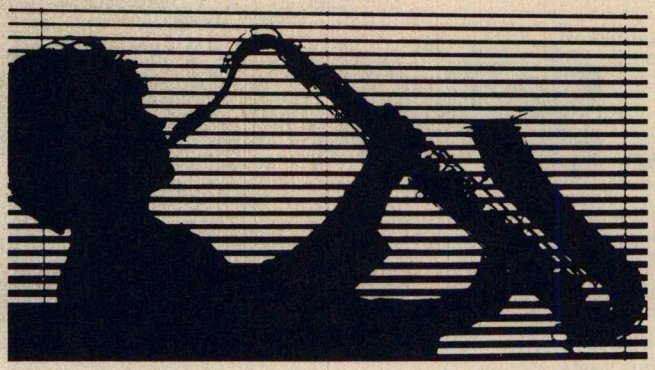
Here's how it works in practice: Place the DX-1 card in one of the peripheral slots in your Apple. Hook its output to your stereo or amp, plug a microphone into the card's minijack input (a converter jack comes with the card, since most microphones use quarter-inch plugs), set the software to the correct option, and then say something. Within the limitations of your chosen sampling rate (the higher the rate, the shorter the sample), the sound of what you said will be recorded into the computer and available for immediate playback or, for that matter, alteration. Now that your voice is just raw data, the computer can do a lot with it, such as transpose its pitch up or down over a five-octave musical range or play it backwards or cut it up into little pieces of sound and rearrange them. It's really up to you, your imagination, and the DX-1 Effects II software.

The system offers several other unusual features. You can play it live from the computer keyboard (or the piano-style keyboards that come with the Soundchaser and Syntauri systems). DX-1 can also create alternative scales (such as pentatonic or just intonation) and use them instead of the standard Western musical scale. It can program and save to disk sound sequences or rhythms, giving you complete control over the duration, pitch, direction, and volume of the sequences. Sounds are stored in "soundbases" of 24K of RAM. The Effects II software comes with three sound sequences (one of which is a standard drum kit) and 12 preprogrammed rhythms.

Other packages from Decillionix for its card include five different disks of sounds; Splash, which is a set of six hi-res displays that are driven by the sampled sounds in real time; and Echo, which allows you to take a sampled sound and "loop" it in memory in different ways, resulting in a variety of echo, reverberation, and feedback effects.

Here's another note of interest for Syntauri owners: Paul Lehrman, an independent software writer, has married the DX-1 and the MusicSystem in an interesting program called Metawave. It lets you take DX-1 samples and use them as the basis for building the waveforms generated by the MusicSystem oscillator cards, so you can create a new range of unique but playable sounds on that instrument.

**You use a KoalaPad or a joystick to doodle shapes and colors across a musical staff.**



**The Apple as Rhythm Section**

It's one thing to sit and play notes, but what about the beat? The DX-1 card comes with some preprogrammed rhythms, and you can create more, but only as an incidental feature to exploring another concept. Where are the different drummers we might march our Apples to?

Coming up fast, I'm pleased to say.

Easiest to start with is the Drum-Key, from PVI (Peripheral Visions Incorporated). It's an interface board and software package that has digitally sampled recordings of 28 different drum and percussion sounds. Kick bass, snare, multiple tom-toms, cymbals, cowbell, tambourine—they're all here, ready to be programmed into patterns or played automatically in one of the 100 rhythm patterns or 26 sounds built into the system. The Drum-Key package is quite impressive overall and includes multitrack and real-time recording, programmable pattern length (up to 32 measures), 28 possible time signatures, 128 possible tempos, rhythm control that allows you to vary the beat, a programmable audio/video metronome, and sync outputs that let you hook Drum-Key into external synthesizers or drum machines.

It's a nifty and elegant package—just what you'd expect from its writer, Bill Mauchly (the musician/engineer son of father-of-the-computer John Mauchly).

If a wider range of control is what you're after, you'll find that the E-Mu Systems GRC (Graphic Rhythm Controller) fits the bill. This product isn't a digital drum set like DX-1 and Drum-Key; it has no sampled sounds. Instead, it is a control package that allows you to directly drive one of the most common professional-quality drum machines on the market, the E-Mu Systems Drumulator. Each half of the system concentrates on doing one thing well, and the net result is exciting. You create parts by writing in standard drum notation, with a few twists. Stem height, for example, lets you set the volume of a note on a hi-res "time grid," using a joystick for data entry. You start by writing measures (of up to 200 notes!), which you can combine into segments and link into songs. At any step of the process, you can store your data, which allows you to create a library of riffs and patterns that you can call up as your musical needs dictate.

The GRC offers tremendous control to its users. Properly programmed, this unit can create such subtle changes in volume and rhythm that it creates the illusion of a live drummer. It's an invaluable tool for small studios, nondrumming composers, bands that can't find a decent drummer to work with, or drummers who want to explore a new way to craft creative rhythms.

**The Apple as Conductor**

If you want to start a conversation at a NAMM show, say the acronym *MIDI*.

NAMM stands for National Association of Music Merchants. Twice a year at NAMM shows, people who make musical instruments trot out their newest and best for dealers and musicians who flock in from around the country. MIDI, in turn, stands for Musical Instrument Digital Interface, a cute acronym for a concept that has turned the field on its head in only a year.

MIDI is a communications standard (sort of) for any instruments or musical gear that contain a micro-

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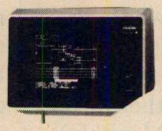

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processor. We're talking about a lot of devices.

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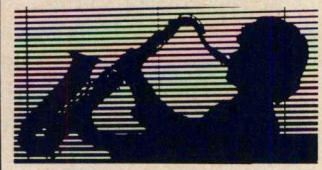
Both Syntauri and Passport Designs have introduced MIDI products recently. Syntauri offers the Proxima MIDI/16 and Proxima MIDI/16x; Passport Designs has brought out the MIDI/4.

MIDI/4 is an Apple-based digital recording studio. The *4* in the package's title refers to the number of synthesizers that it can directly and independently control (you can pack in even more by running them as "slave" units to a MIDI-controlled instrument, but they can play only whatever the MIDI-machine plays). It also has a drum sync, so that an external drum machine can provide a control pulse for the system, keeping everything tied to a beat.

MIDI/4 can record not only notes played on the MIDI instruments, but also performance nuances such as key velocity, pitch bend, modulation, and so forth. The system has been licensed for distribution by several major manufacturers in the synthesizer field, including Yamaha.

Polywriter for MIDI is much the same product as Polywriter for the Soundchaser. It takes what you play on a keyboard, converts it to musical notation, and then prints it out on paper. You can edit the score while it is still inside the computer's memory and insert lyrics and performance directions for tempo, volume, and playing style.

Syntauri offers the Proxima MIDI series of products, which includes the Proxima MIDI-1 interface card and the Proxima MIDI/16 and MIDI/16x software packages. The two software packages offer full 16-track recording and the ability to control up to 16



## A single Apple may soon serve as the heart of a unified network.

MIDI-compatible instruments, such as Yamaha synthesizers, and Roland synthesizers and drum machines. The MIDI/16x software utilizes the Synetix flashcard's 288K RAM card to increase recording capabilities to a whopping 20,000 notes.

MIDI's future should be bright, especially as software development accelerates. Every major manufacturer in the field is creating MIDI-based software for a variety of instruments and computers, and the companies that aren't engaged actively in development are trying to license the work of "garage guys," musical hackers such as Kevin Laubach and the folks in the Hybrid Arts company.

A single Apple may soon serve as the heart of a unified network of musical tools that reaches from drums, guitars, and keyboards, through recording, mixing, and signal processing. Such is the potential power of MIDI, once it is fully tapped.

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**The Mockingboard** (digital oscillator/speech-generator card)
Sweet Micro Systems
Cranston, RI 02920
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**The Super Music Synthesizer**
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**Mountain Computer MusicSystem**
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**Syntauri**
Syntauri Corporation
1670 South Amphlett Boulevard
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(415) 574-3045
**List Price:** Hardware/software packages include the Syntauri Computer Music System, $1495; the Simply Music Five System, $1295; the Simply Music Four System, $995; and the Musicland Games System (without keyboard), $495. Software includes Musicland, $149; Simply Music, $179.95; Composer's Assistant, $179; Metatrak II, $179; alphaPlus sound-definition system, $150; Musicmaster, $75; and Dolphin Dialog, $39.
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**East Coast Syntauri User's Group**
For information about the group and its floppy-disk magazine, *SynDisk*, contact David Wilson at 218-04 40th Avenue, Bayside, NY 11361. Annual membership is $35; programs generated by User's Group members include alphaPlus Enhancers, from Streifert Software, 48-11 59th Street, Woodside, NY 11377 ($39.95) and; a MusicSystem-to-Syntauri Conversion package from David Schiminovich, 80 Chester Place, Englewood, NJ 07631 ($30).
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**West Coast Syntauri User's Group**
For information, contact Joe West at Computers and Music, 1989 Junipero Serra, Daly City, CA 94014.
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Passport Designs
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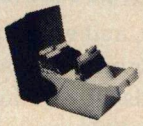

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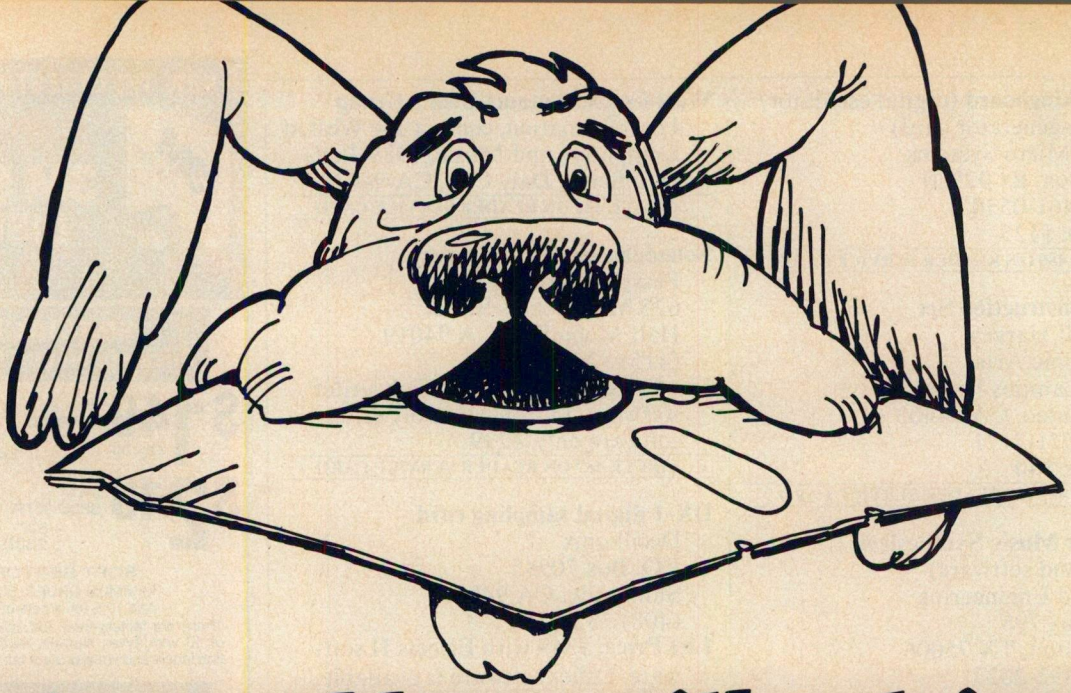

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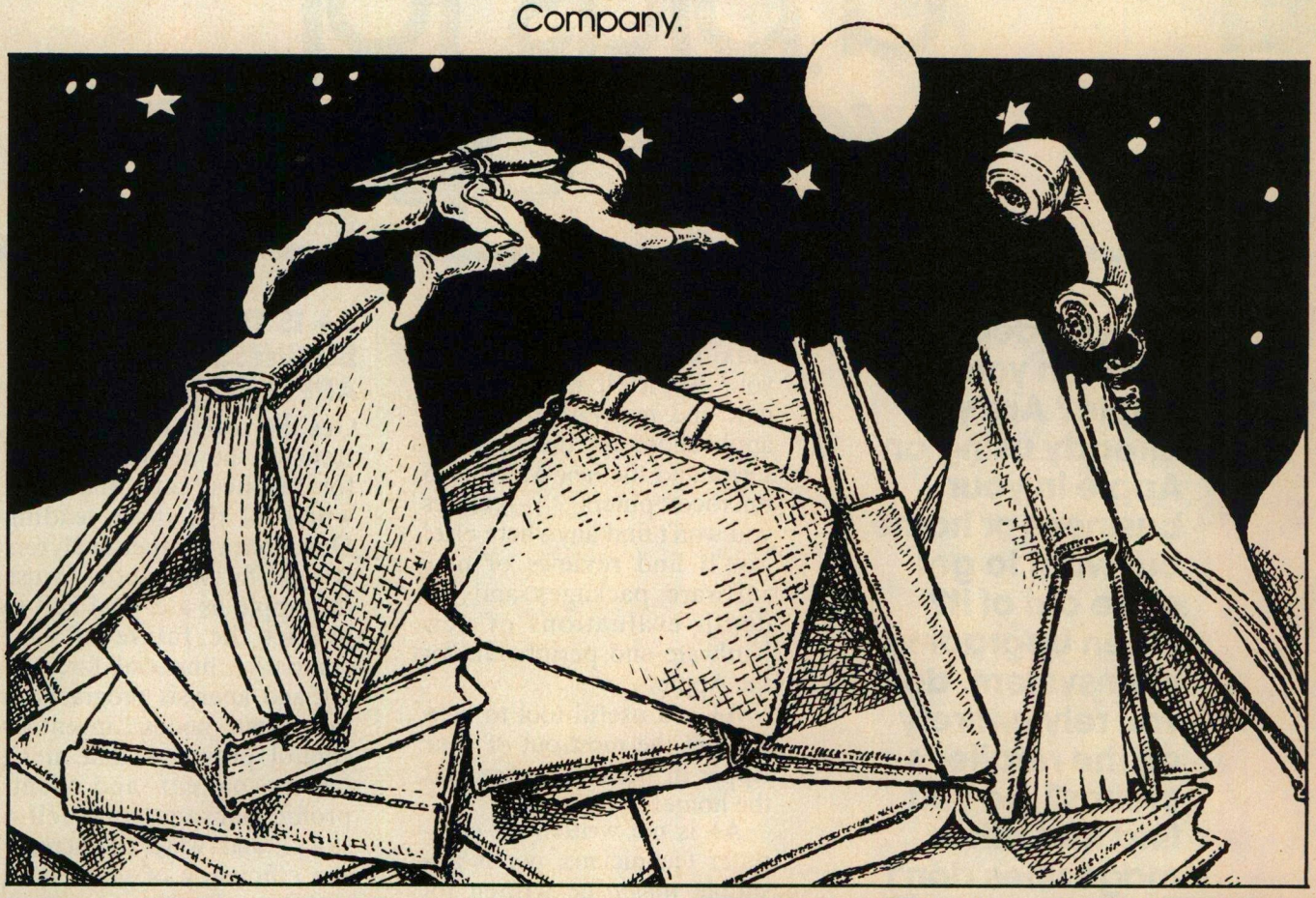

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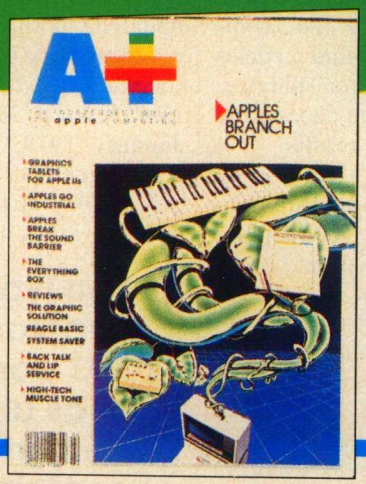


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The Magazine Index contains a subset, Magazine ASAP, that contains the entire text of all articles in 58 selected publications. Coverage begins in January 1983 and is updated monthly. You can view articles on the screen, print them out on your printer, or have Dialog Information Services mail you a printout of the articles.

**National Newspaper Index**

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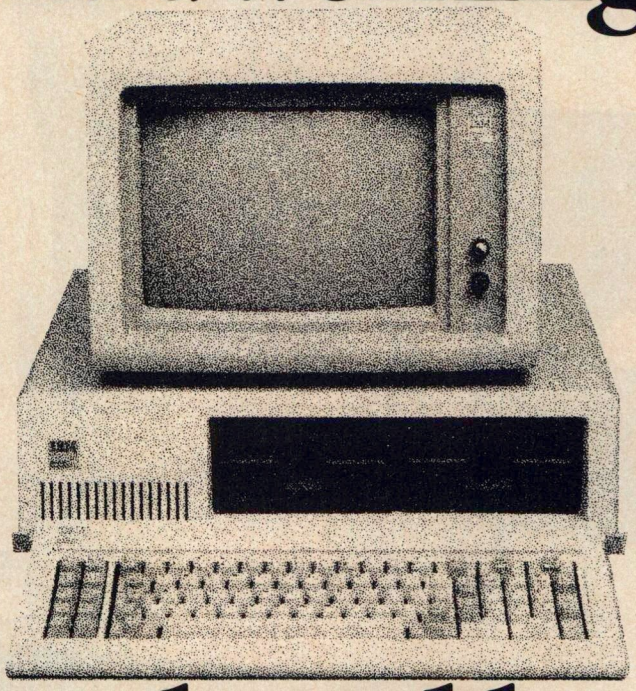

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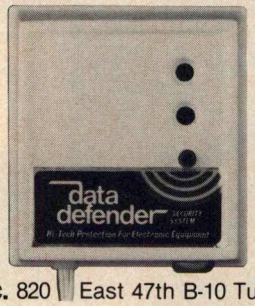


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**Two New Services on CompuServe**

We gave an overview of CompuServe in the first issue of *A+*, November 1983, and that information is still fairly accurate. CompuServe is steadily adding new services, however, and two are especially noteworthy.

If Hawaii is your kind of place, dial into the Computer Job Bank. As you may surmise from the name, Computer Job Bank is an electronic help-wanted database that advertises local and national jobs in the computer, communications, and information fields.

Employment opportunities are posted the same day they are received and remain in the database for up to six weeks or until filled. Prospective applicants can transmit their resumes via electronic mail, which arrives at the company within hours, or in the more traditional way through the regular mail.

Computer Job Bank carries no charge other than the normal CompuServe subscriber rates. Advertisers need not subscribe to CompuServe in order to post their openings.

The other new service, the Creative Computing Special Interest Group (CCSIG), is a place to find new uses for your Apple. *Creative Computing*, a sister publication of *A+*, covers the entire computer industry, including Apple Computer, Inc., and provides in-depth reviews of products, peripherals, and software for your Apple.

Once on the CCSIG, you can read the monthly Apple column, upload and download programs, and find out what is going on in the computer world. One of the best reasons to visit the CCSIG is to talk not only to Apple enthusiasts, but to Atarians, Commodoreans, and IBMers too.

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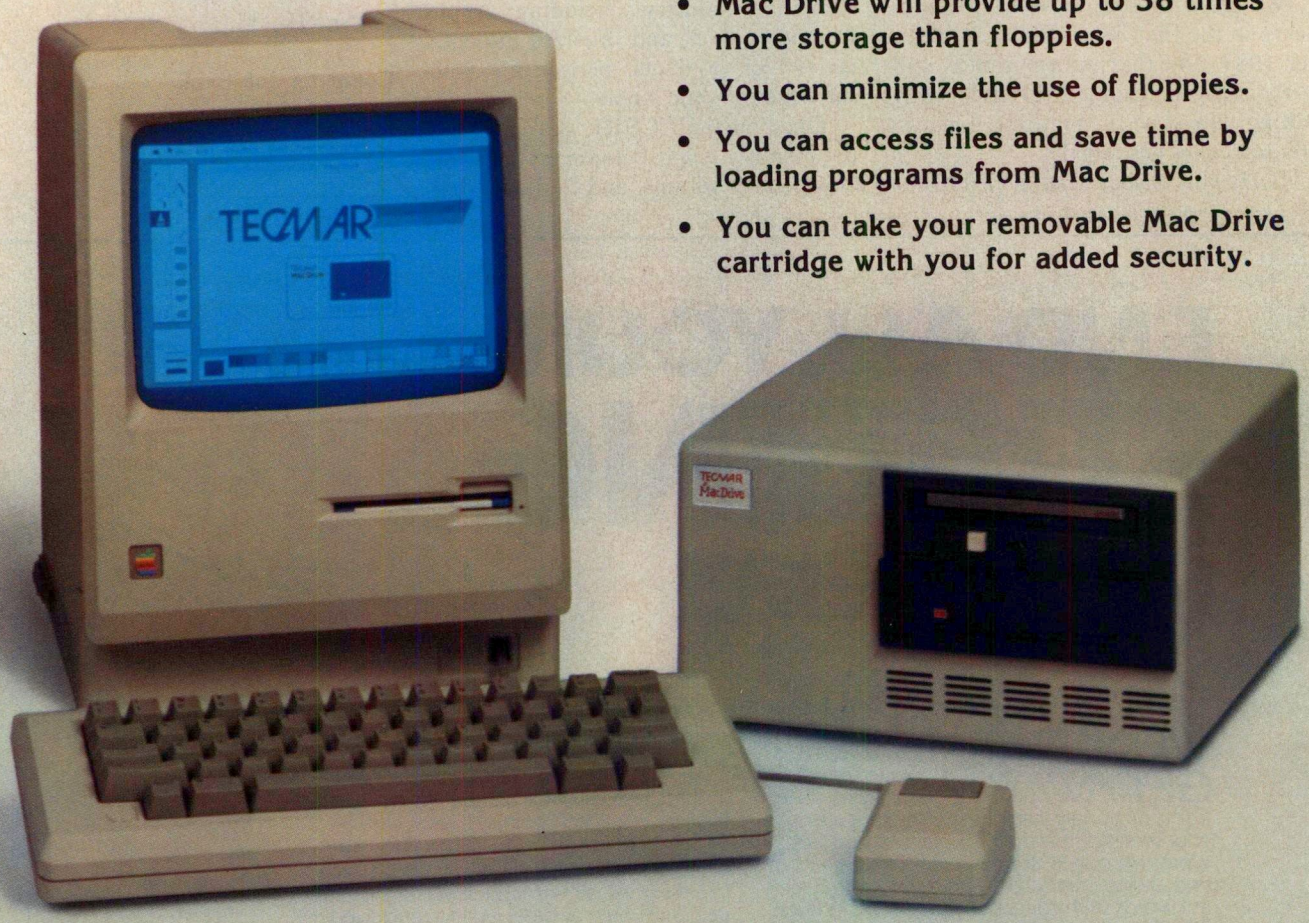


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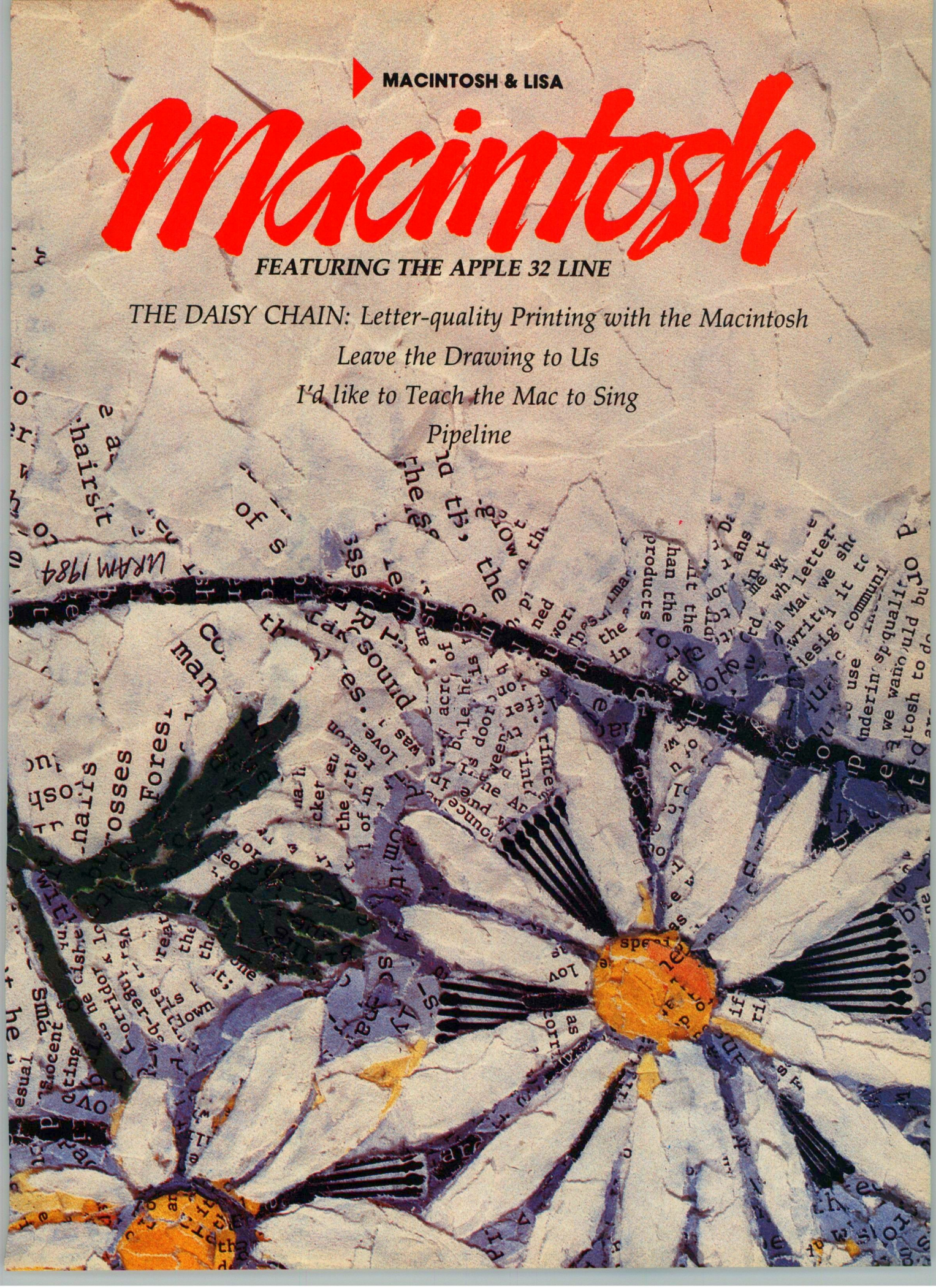

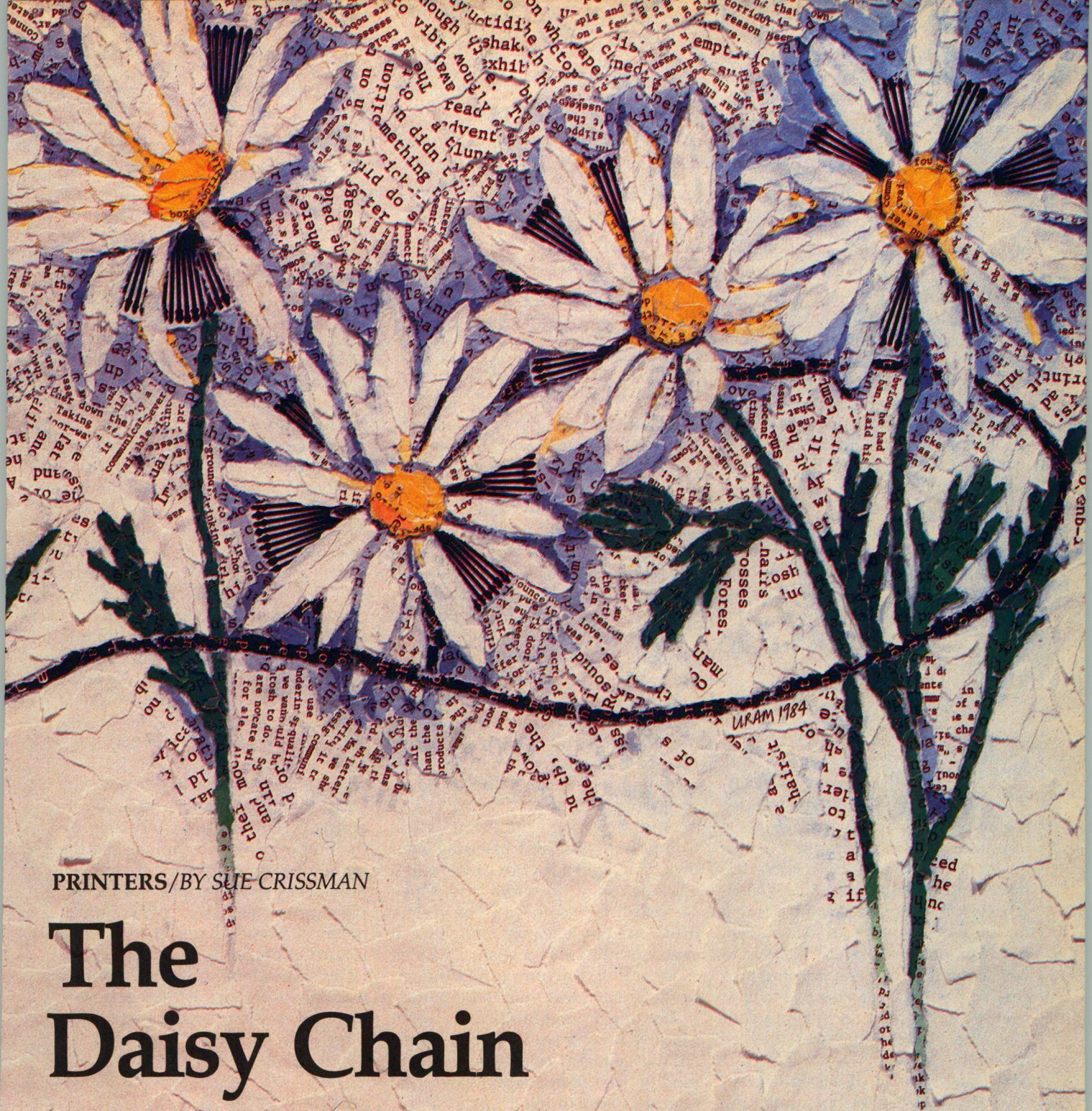


**PRINTERS**/*BY SUE CRISSMAN*

# The Daisy Chain

## *Letter-quality printing with the Macintosh*

When Apple announced the Macintosh last January, the computer was compatible with only one printer, the Apple Imagewriter. Those of us who already owned a printer and were interested in a Mac, as well as those of us who wanted to use a letter-quality printer, didn't have to spend much time wondering if we should buy a Macintosh. It simply wouldn't do what we wanted it to do. Now the situation is different. Several products that permit the Macintosh to communicate with printers other than the Imagewriter are available. Although some of these printers are designed for a specific printer, two are generalists; that is, they work with a variety of different printers.

What these products do is take the Macintosh codes that produce dots on the Imagewriter and translate them into information that a letter-quality printer can understand. The process requires both software and hardware. The software handles the code translations, and the hardware (in the simplest case, a cable) carries the information to your printer.

**Simple or Sophisticated**

Both the Mac Daisywheel Connection from Assimilation Process and the Printer Optimizer from Applied Creative Technology, Inc., can get the job done. These two products are

LAUREN URAM

quite different from each other, however. The Mac Daisywheel Connection is essentially a diskette that performs the code translations. Created by the team that designed MacWrite, it works in the usual Macintosh style—simply and straightforwardly. You insert the diskette, click on a few answers in dialog boxes, and you're off and printing.

The Printer Optimizer, on the other hand, was designed before the Mac came out and was intended to do many more things than speak Macintosh. That you can use it to print from MacWrite to a letter-quality printer is just one feature of this sophisticated product. The Optimizer serves as a buffer to free up your Mac while you're printing out documents, lets you connect up to three printers (both serial and parallel), provides alternate storage areas that are useful for merging documents, and lets you program a variety of commands and control codes.

This kind of versatility means a complex product and a higher price. If your main objective is to print from a Macintosh to a letter-quality printer, you'll probably be more interested in the Mac Daisywheel Connection. If you are doing a lot of work with your Macintosh, however, and don't want to have to wait around during the printing process, or if you'd like to be able to connect several different printers to your Mac, the Printer Optimizer may be the better choice.

**Mac Daisywheel Connection**

When you open the box containing the Mac Daisywheel Connection, you'll see two diskettes (a master and a backup), a cable, and a 39-page manual. To get started, you plug the cable into your printer and your Mac. This product works only with serial printers.

If you have a serial printer that does not have a DB-25 connector, you may have to purchase a special adapter—several types are available from Assimilation Process. Next, you insert the disk and open the application icon. The manual provides specific instructions for printing both

*If your main objective is to print from a Macintosh to a letter-quality printer, you'll probably be interested in the Mac Daisywheel Connection.*

MacWrite and Multiplan documents; it states that the Mac Daisywheel Connection "will be compatible with any Macintosh software program which can normally print via the standard Imagewriter driver."

To print with MacWrite, you start by opening the Mac Daisywheel Connection icon. The first dialog box shows current settings; by clicking on New Settings, you'll get another dialog box, which allows you to choose the type of printer you want to use, the transmission rate, and whether you want output from the printer or the modem port. You then set specifications for page length, pitch, paper feed, and line spacing. At this point, you're ready to print.

After ejecting the Daisywheel Connection disk and inserting your own, you'll get a list box of your files. Clicking on a filename and Open causes printing to begin. The system includes a pause feature, and you can cancel printing if you wish. That's all there is to it. I accomplished the entire process in less than ten minutes.

Printing from Multiplan or other Macintosh software is slightly different but equally easy. You have to modify the Imagewriter driver on your disk so that letter-quality printing replaces the Draft mode. This modification involves copying the Set Printer file to your Multiplan disk, opening it, and following the instructions on the screen.

Once you've completed this procedure, you use the usual Print commands in Multiplan. When you choose Page Setup, the dialog box will be the standard Multiplan version, with one exception: the choice for A4 paper has been replaced with a choice for wide-carriage printing. This option formats your daisy-wheel printer for up to 14 inches of printing. Once you've organized things onto the proper disk, you simply print out the information on it.

Of course, the actual size and style of your type will depend on the print wheel you're using, but if your printer supports them, the Mac Daisywheel Connection will let you print bold and underlined print, as well as subscripts and superscripts.

The Mac Daisywheel Connection package includes information about updates for future Macintosh applications. Efforts are under way to sell the product as part of a bundle with the Qume LetterPro 20. This combination should save you about $100, compared to purchasing each product separately.

**Printer Optimizer**

When you open the Printer Optimizer package, you find a metal 10 × 7 × 3½-inch box with a digital display and a keypad on the front, a small plastic envelope of jumper wires, and a three-ring binder with more than 100 pages of text. An additional 15-page manual and a diskette specifically for use with the Macintosh are also part of the package.

Setting up the system involves several steps. You have to remove the cover of your computer and set several sets of DIP switches to match up the output of your computer and the input of your printer. The manual provides several "recipes" for accomplishing this task, but if you happen to have a printer that is not described in the Optimizer manual, you'll have to do some sleuthing in your printer manual, or perhaps with your dealer, in order to discover the correct settings.

Because the Printer Optimizer is designed for use with virtually any computer and printer (both serial and parallel), a cable is not included with the product. As the manual explains, "You, or someone you hire, must determine what kind of connector should be installed on each end of both cables, plus the wiring layout inside the connectors, and the length of each cable." I chose not to hire someone, and I did it myself.

Connecting the Printer Optimizer

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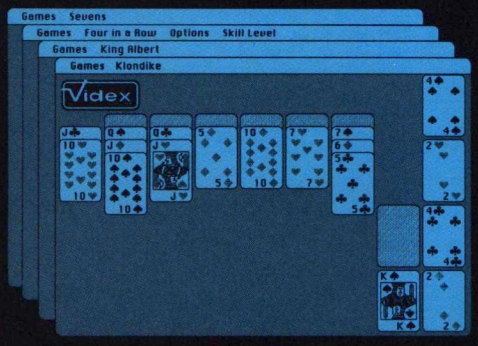


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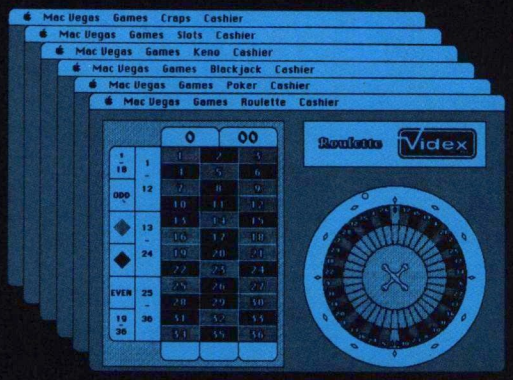


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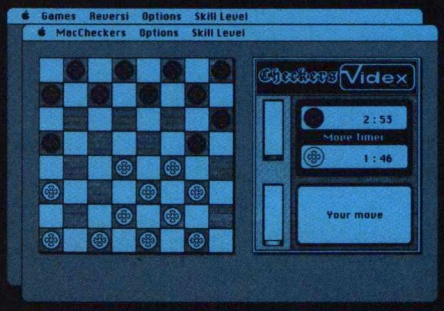


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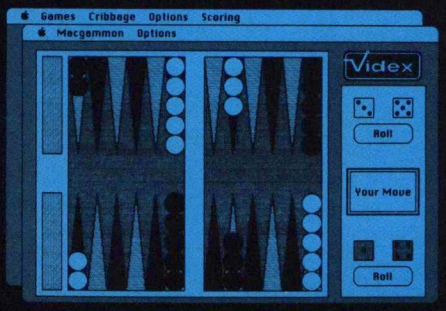


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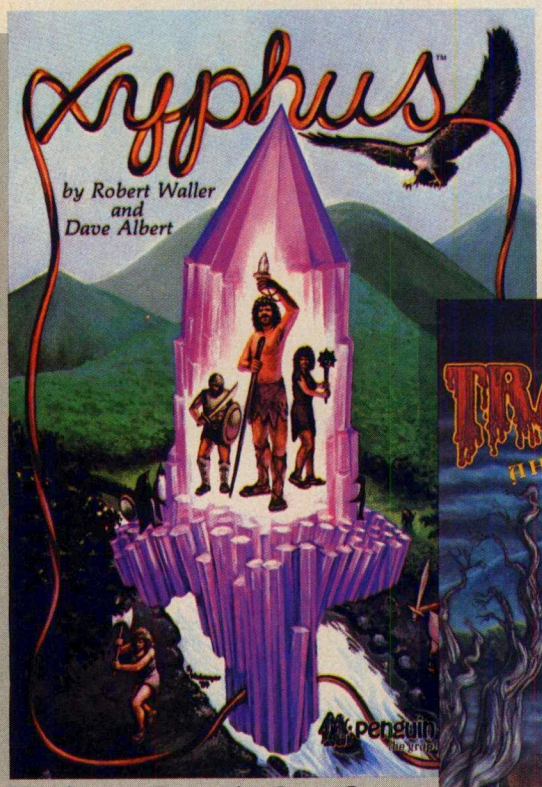


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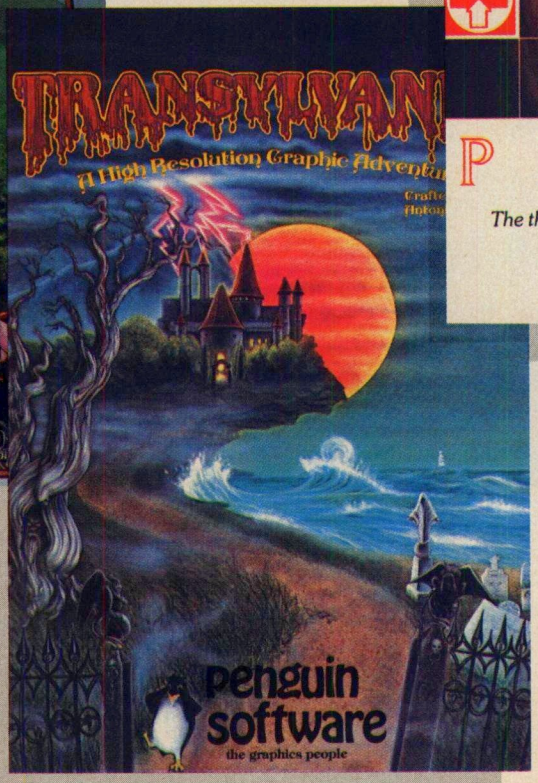

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for use with the Imagewriter is easy; it comes with all the instructions you need for cable selection, DIP switch setting, and jumper-wire attachment.

You may be wondering why you'd want to set a Macintosh up with an Imagewriter in the first place. After all, your Macintosh already works with an Imagewriter. The Optimizer, however, lets you dump your MacWrite documents into the buffer, and once you've done so, you can continue to use your Macintosh while the Optimizer handles your printing job. Once I started using this feature, I found myself immediately attached to it. Earlier printing efforts had always left me looking for coffee and other distractions during printing time; with the Optimizer, on the other hand, I could continue working on the Macintosh.

onnecting a letter-quality printer to your Macintosh takes more time and energy than connecting an Imagewriter, especially if your printer is not one of those in the Optimizer's preconfigured setups. Like all setup procedures, however, once it's done, it's done, and you won't have to worry about it again, until the time comes to add an additional printer or plotter.

Then we have the matter of translation codes. In general, the Printer Optimizer leaves making a translation table for the codes up to you; the manual explains translation equations in great detail. For use with MacWrite, however, it includes complete instructions, and you can get the code (at an extra charge) on diskette. By using the keypad, your Macintosh, and the Opti-Auto-Program diskette, you can easily install the codes that you need to translate your MacWrite program into a format that a letter-quality printer can utilize. Once the translation is finished, the printing process is reasonably straightforward.

Again, the type of print you'll get depends on your print wheel and the capabilities of your printer. When you create text with MacWrite, the Printer Optimizer restricts you to the 12-point Monaco, Plain typeface. Since capabilities such as boldfacing and underlining vary across printers, you may have to do some extra work to accomplish these tasks.

*The longer your documents, the more time you'll save with the buffering capabilities of the Printer Optimizer.*

**Buffering and Switching**

These procedures may seem formidable, especially compared to the simplicity of the Mac Daisywheel Connection, but the Printer Optimizer is really designed to provide other, more sophisticated benefits. In computer parlance, the Printer Optimizer is known as a buffer and a switch box. As for buffering, the basic unit comes with 64K of memory on one Optimem memory board, and you can add up to three more Optimems for a total memory capacity of 256K. (The 64K of memory will give you about 16 pages of dot-matrix print.)

Letter-quality printers require much more code information (especially if you're using features such as right-justification or proportional spacing), so 64K of memory can accommodate only six pages or so of letter-quality text. Adding an additional board to bring memory capacity up to 128K should allow you to dump most of your MacWrite documents for a letter-quality printer directly into the Optimizer. The longer your documents, the more time you'll save with the buffering capabilities of the Printer Optimizer.

The Optimizer's switching capabilities involve changing either from one printer to another or from one job to another. If you have two printers attached to your Macintosh, you can dump in a job for each printer, enter some code to tell which job should go where, and leave the work to your Optimizer. You don't have to print jobs in the order in which you created them or entered them into the Optimizer.

The system gives you alternate storage areas, so you can store different jobs and switch back and forth between them with control codes. An example is working with mailing lists. You can have your names and addresses in one storage area and the text of your letter in another. You then program the Optimizer to switch back and forth between the two areas and print out your letters, including the names and inside addresses. You can also use storage areas to print multiple copies of any document whenever you want originals instead of photocopies.

The Printer Optimizer is a modular system, so you can purchase the parts you need for your current system and expand to meet future needs. If you want to start by connecting your Macintosh to your current printer, you'll need the basic unit and, if you have a serial printer, the Opticom board. You may want to expand memory capacity, especially if a hard disk is in your future.

**Which One?**

Both of these products will get your Macintosh working with a letter-quality printer. If that is your only goal, the Mac Daisywheel Connection will do the job. On the other hand, if you want a more powerful product that enables you, among other things, to drop your document into a buffer and continue using your Mac, make use of switching capabilities, expand your Macintosh into a larger system, or use the product with other computers, the Printer Optimizer is certainly worth considering. +

## PRODUCT INFORMATION

**Mac Daisywheel Connection**
Assimilation Process
20833 Stevens Creek Blvd.
Cupertino, CA 95041
(408) 446-0797
**List Price:** $99

**Printer Optimizer**
Applied Creative Technology, Inc.
2156 West Northwest Highway
Suite 303
Dallas, TX 75220
(800) 433-5373
In Texas: (214) 556-2916
**List Price:** Basic Optimizer unit for parallel devices (64K), $499; Opticom board for one serial input and one serial output, $99; Opticom+ for two serial outputs, $149; additional memory board (64K), $139; Opti-Auto-Program diskette, $25.95

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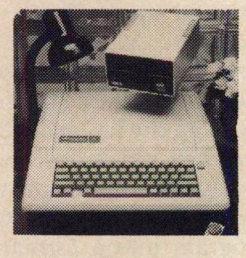

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| **Living Videotext** *Think-Tank* | 85.00* |
| **LJK** *DataPerfect* | 80.00* |
| **LJK** *LetterPerfect* | 60.00* |
| **Microsoft** *Applesoft Compiler* | 99.00* |
| **Microsoft** *Multiplan (DOS or CPIM)* | 110.00* |
| **Microsoft** *MS: Financial Statement* | 57.00* |
| **Microsoft** *A.L.D.S.* | 70.00* |
| **Microsoft** *Word for Macintosh* | 110.00* |
| **Microsoft** *File for Macintosh* | 110.00* |
| **Microsoft** *Multiplan for Macintosh* | 110.00* |
| **Microsoft** *Basic for Macintosh* | 85.00* |
| **Microsoft** *Chart for Macintosh* | 71.00* |
| **Microstuff** *Crosstalk* | 105.00* |
| **Monogram** *Dollars & Sense* | 57.00* |
| **Softcraft** *Fancy Fonts* | 125.00* |
| **Software Publishing** *PFS:File* | 71.00* |
| **Software Publishing** *PFS:Write* | 71.00* |
| **Software Publishing** *PFS:Graph* | 71.00* |
| **Stoneware** *DB Master Version 4* | 199.00* |
| **Verbatim** *Disk Drive Analyzer* | 23.00* |

## HARDWARE

**(Please add shipping and handling charges found in italics next to price.)**

### COMPLETE SYSTEMS

| | | |
|---|---|---|
| **Apple** *Lisa All Configs Available* | CALL | |
| **Apple** *Macintosh Base System* | 1,800.00* | *(39.10)* |
| **Apple** *//c All Configs Available* | 940.00* | *(20.30)* |
| **Apple** *//e 100% Apple Starter System* | 1,032.00* | *(30.20)* |
| **Columbia** *Desktop & Portable Systems* | CALL | |
| **Eagle** *Desktop PC and Spirit Portables* | CALL | |
| **IBM** *PC 2 DSDD Floppy Drives/256K* | 1,736.50* | *(37.51)* |
| **IBM** *Hard Disk 1 Floppy/10Mb Hard Disk/256K* | 2,384.00* | *(51.50)* |
| **NEC** *Notebook (New Lower Price)* | 420.00* | *(10.00)* |
| **Sanyo** *MBC-550 "Lowest Cost MS-DOS System"* | 640.00* | *(15.00)* |
| **Tava** *Complete IBM compatible* | 1,475.00* | *(31.86)* |
| **Texas Instruments** *Professional* | CALL | |

### DISK DRIVES & CONTROLLERS

| | | |
|---|---|---|
| **Alps** *AP-100A Dual Apple Drives in One Case* | 309.00* | *(7.00)* |
| **Alps** *AP-100B Same as 100A with One Drive* | 159.00* | *(4.00)* |
| **Alps** *AP-100C Slimline Drive in Case* | 159.00* | *(4.00)* |
| **Apple** *ALL MODELS* | CALL | |
| **Corvus** *6MB Hard Disk* | 1,436.00* | *(31.02)* |
| **Davong** *Hard Disks for Macintosh* | CALL | |
| **Franklin** *Data X-10 10MB Hard Disk* | 1,305.00* | *(28.20)* |
| **Micro-Sci** *A2 143KB Drive* | 185.00* | *(5.00)* |
| **Micro-Sci** *Floppy Controller* | 55.00* | *(2.50)* |
| **Rana** *Elite I 163K Drive* | 225.00* | *(5.00)* |
| **Rana** *Elite II 326K Drive* | 320.00* | *(7.00)* |
| **Rana** *Elite III 652K Drive* | 398.00* | *(10.00)* |
| **Rana** *Floppy Controller* | 70.00* | *(2.50)* |
| **Panasonic** *Half Height DSDD Drive —No Case* | 130.00* | *(2.81)* |
| **Shugart** *AP-50 Full Height Add-On* | 155.00* | *(4.00)* |
| **Tandon** *TM100-2 Full Height DSDD Drive Only* | 158.00* | *(3.41)* |
| **Teac** *FD55-B Half Height DSDD Drive Only* | 140.00* | *(4.00)* |

### MEMORY CHIPS

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| | | |
|---|---|---|
| **64K Memory Upgrade Kits (9 Chips)** | 40.50* | *(1.00)* |
| **64K Dynamic Ram Chips (Each)** | 4.50* | *(1.00)* |

### MODEMS

| | | |
|---|---|---|
| **Anchor** *Volksmodem* | 47.00* | *(2.50)* |
| **Anchor** *Mark XII LOWEST PRICE 1200BPS HAYES COMPATABLE EXTERNAL MODEM!* | 230.00* | *(5.00)* |
| **Hayes** *Micromodem //e w/Smartcom* | 200.00* | *(2.50)* |
| **Hayes** *Smartmodem 300* | 180.00* | *(3.60)* |
| **Hayes** *Smartmodem 1200B with Smartcom II* | 366.90* | *(2.50)* |
| **Hayes** *Smartmodem 1200B without software* | 299.00* | *(2.50)* |
| **Novation** *Apple Cat II* | 196.00* | *(2.50)* |
| **Novation** *212 AppleCat* | 369.88* | *(2.50)* |
| **Prometheus** *ProModem 1200* | 325.00* | *(8.00)* |
| **Rixon** *R212A Stand Alone 1200BPS* | 335.00* | *(8.50)* |
| **U.S. Robotics** *Password (Compact 1200BPS Ext'l)* | 290.00* | *(6.50)* |

### MONITORS

| | | |
|---|---|---|
| **Amdek** *Video 300G Composite Monitor* | 110.00* | *(3.00)* |
| **Amdek** *Video 300A Composite Monitor* | 120.00* | *(3.00)* |
| **Amdek** *Video 310A IBM Type Monochrome Monitor* | 130.00* | *(3.00)* |
| **Amdek** *Color 300 Composite Color* | 215.00* | *(6.00)* |
| **Amdek** *Color 500 RGB Color* | 320.00* | *(6.00)* |
| **Amdek** *DVMIII RGB Monitor Interface Card* | 110.00* | *(2.50)* |
| **Princeton** *HX-12 RGB Monitor* | CALL | |
| **Taxan** *210 Combination RGB/ Composite Display* | 230.00* | *(6.00)* |
| **Zenith** *ZVM-123 High Res Green (Consumer Reports Rated Best Buy!!)* | 76.00* | *(2.50)* |
| **Zenith** *ZVM-131 13" RGB Color w/Green Switch* | 275.00* | *(6.00)* |

### BOARDS AND BUFFERS

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|---|---|---|
| **ALS** *ZCard II* | 96.33* | *(2.50)* |
| **Digital Research** *CP/M Gold Card w/192K* | 465.00* | *(2.50)* |
| **Microsoft** *Premium Softcard //e* | 243.67* | *(2.50)* |
| **Microtek** *Dumpling/GX* | 55.00* | *(2.50)* |
| **Microtek** *Magnum 80me 80Col + 64K* | 93.00* | *(2.50)* |
| **Orange Micro** *Grappler +* | 96.90* | *(2.50)* |
| **Orange Micro** *Grappler/Bufferboard* | 113.05* | *(2.50)* |
| **PC Network** *Z80 Card* | 35.00* | *(2.50)* |
| **PC Network** *Printer Card w/Cable* | 40.00* | *(2.50)* |
| **Personal Comp Prod** *6MH Appli-Card with 8088/BASIC/MS-DOS* | 552.00* | *(2.50)* |
| **Quadram** *MP-8 8K Microfazer Buffer (expandable)* | 110.00* | *(2.50)* |
| **Quadram** *APIC Parallel Interface* | 57.00* | *(2.50)* |
| **Quadram** *APIC/G Graphics Interface* | 62.00* | *(2.50)* |
| **Street Electronics** *ECHO II Speech Synthesizer* | 100.00* | *(2.50)* |

### PRINTERS

| | | |
|---|---|---|
| **Abati** *18CPS Letter Quality Printer* | 340.00* | *(8.00)* |
| **C. Itoh** *Starwriter F10/40 40 CPS LQ* | 875.00* | *(18.90)* |
| **Comrex/Brother** *CR-II 13CPS LQ Printer* | 385.00* | *(8.62)* |
| **Comrex/Brother** *Typewriter Keyboard for CR-II* | 150.00* | *(3.25)* |
| **Comrex/Brother** *Cut Sheet Feeder for CR-II* | 180.00* | *(3.89)* |
| **Epson** *RX-100 100CPS Wide Platen* | 475.00* | *(11.00)* |
| **Epson** *FX-80 160CPS 80 COL* | 415.00* | *(9.25)* |
| **Epson** *FX-100 160CPS Wide Platen* | 600.00* | *(14.35)* |
| **Epson** *LQ1500 NEW LQ/DP Printer* | CALL | |
| **Epson** *IBM-to-EPSON Parallel Cable* | 21.00* | *(1.00)* |
| **IDS** *Prisim 132Color w/all optns* | 1,365.00* | *(30.00)* |
| **NEC** *2030 20CPS Letter Quality Printer* | 625.00* | *(16.53)* |
| **NEC** *3530 33CPS Letter Quality Printer* | 1,185.00* | *(31.54)* |
| **Okidata** *82A Serial & Parallel* | 280.00* | *(7.00)* |
| **Okidata** *ML92P 160CPS 80 Col Printer* | 395.00* | *(8.55)* |
| **Okidata** *IBM-to-Okidata Parallel Cable* | 20.75* | *(1.00)* |
| **Quadram** *Quadjet Multicolor Ink-Jet* | 535.00* | *(12.00)* |
| **Qume** *Sprint 11/45 45CPS Letter Quality* | 1,155.00* | *(24.40)* |
| **Qume** *IBM Cable and Interface (required)* | 72.00* | *(1.00)* |
| • **Star Micronics** *Gemini 10X* | 246.00* | *(6.00)* |
| **Talley** *MT-160L 160CPS DP/LQ Printer* | 540.00* | *(12.00)* |
| **Texas Instruments** *855 DP/LQ w/Tractor* | 716.00* | *(15.50)* |
| **Toshiba** *P-1351 160/100 CPS DP/LQ* | 1,200.00* | *(25.92)* |

### ACCESSORIES AND SUPPLIES

| | | |
|---|---|---|
| **Brand Name SSSD Diskettes** *Guaranteed for Life!! Box of 10* | 11.00* | *(1.00)* |
| **Chalkboard** *Powerpad* | 62.00* | *(1.50)* |
| **Kensington Microware** *System Saver Fan* | 56.97* | *(1.50)* |
| **Koala** *KoalaPad Touch Tablet* | 78.00* | *(1.50)* |
| **Hayes** *Mach II Joystick for //e* | 25.00* | *(1.50)* |
| **Hayes** *Mach III Joystick w/Fire Button for //e* | 31.00* | *(1.50)* |
| **M & R** *Sup-R-Mod RF Modulator* | 44.00* | *(1.50)* |
| **PC Network** *Cooling Fan with Surge Protector & Dual Outlets* | 25.00* | *(2.50)* |
| **WP Printer Paper** *2600 Sheets Microfine Perfs* | 17.00* | *(10.00)* |

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**†6 OPTIONAL BUSINESS RENTAL LIBRARY**—All members can join our BUSINESS RENTAL LIBRARY for just $25 PER YEAR above the base membership fee. **This entitles you to rent business software AT JUST 20% of the DISCOUNTED PRICE FOR A 12 DAY PERIOD. If you decide to keep the software, the entire rental fee is deducted from the purchase price. VIP MEMBERS GET A FULL 21 DAYS for just $30 above the V.I.P. base fee. This also includes the game library privileges for a $5 combination savings.**

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**8 SPECIAL SAVINGS BULLETINS—THE PRINTOUT**—The NETWORK seeks every opportunity to save money for its members. We buy excess dealer inventories, and store bankruptcy closeouts regularly. We then turn around and make this merchandise (only top quality name brand products) available to our members at fantastic savings via THE PRINTOUT, our newsletter and savings bulletins.

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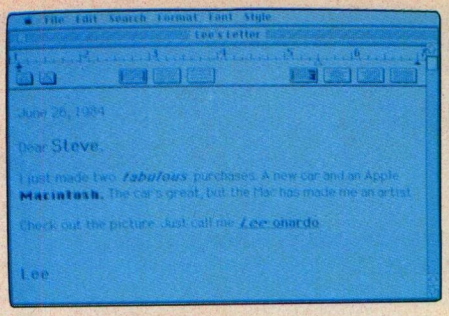
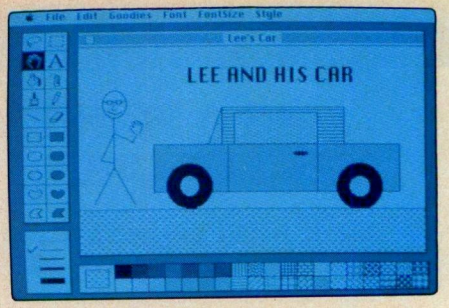
**15 10 DAY RETURN POLICY—If you are not satisfied, for any reason with any hardware component purchased from The NETWORK within 10 days of receipt, we will refund your entire purchase (less shipping) with no questions asked.**




# It's time to get

The reviews are in and everyone agrees. There's never been a personal computer that's easier or more fun to use than the Macintosh.™ Especially with terrific programs like MacWrite™ and MacPaint™ to get you started.

But if you really want to take full advantage of your Mac's tremendous abilities, you'll need to go a step further than just writing letters and painting pictures. You'll need some serious business tools to make you more productive.

And the first one to purchase is Habadex.

**Desktop management has arrived.**

Habadex is pioneering an entirely new category in computer software—desktop management. It's the only program that lets you do on your Mac what you now do on your desk. So you can put your address and phone directory, appointment calendar, things-to-do list—and any other paperwork that clutters your desk and your mind—right into your Mac.

And because Habadex was designed specifically for the Macintosh, it incorporates all of the same graphic capabilities that have made Apple's new computer so incredible. And incomparable.

**A data base based on your own needs.**

Habadex lets you create and sort hundreds of records. You can arrange the large number of fields however you choose. By first name, last name, company, category, zip code, etc. You can even rename fields, and rearrange or change information easily for complete flexibility.

**You've found your calling.**

Habadex lets you create and arrange an entire phone directory within your data base. It dials direct and long-distance calls, automatically inserting your O.C.C. like Sprint or MCI. It has a quick-dial feature for storing commonly-called personal or emergency numbers. And it works with the inexpensive HabaDialer or your current modem.

Habadex is a trademark of Haba Systems, Inc., 15154 Stagg Street, Van Nuys, California 91405-1025, (818) 901-8828. Macintosh is a trademark licensed to Apple Computer, Inc. ©1984 Haba Systems Inc.

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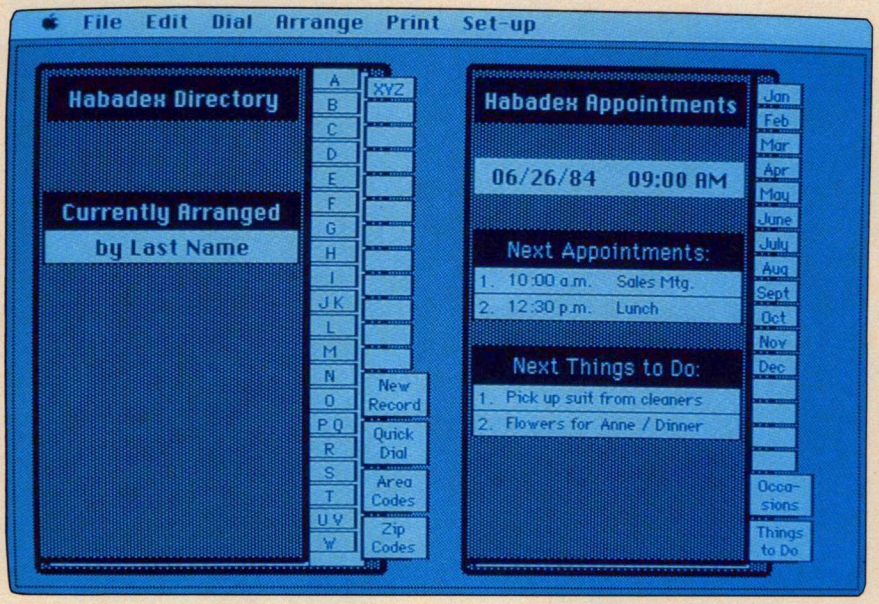


**Print it your way.**

Habadex also prints mailing labels and custom lists in any format and size of your choosing. It mail merges form letter text with your data base and prints them for any or all of your records —in virtually any order, arrangement or quantity. And in your choice of fonts.

Are you ready to get more from your Mac than just words and pictures? Then you're ready for Habadex. It's the serious business tool that still lets you have some serious fun.

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Making Apples more tempting than ever.™

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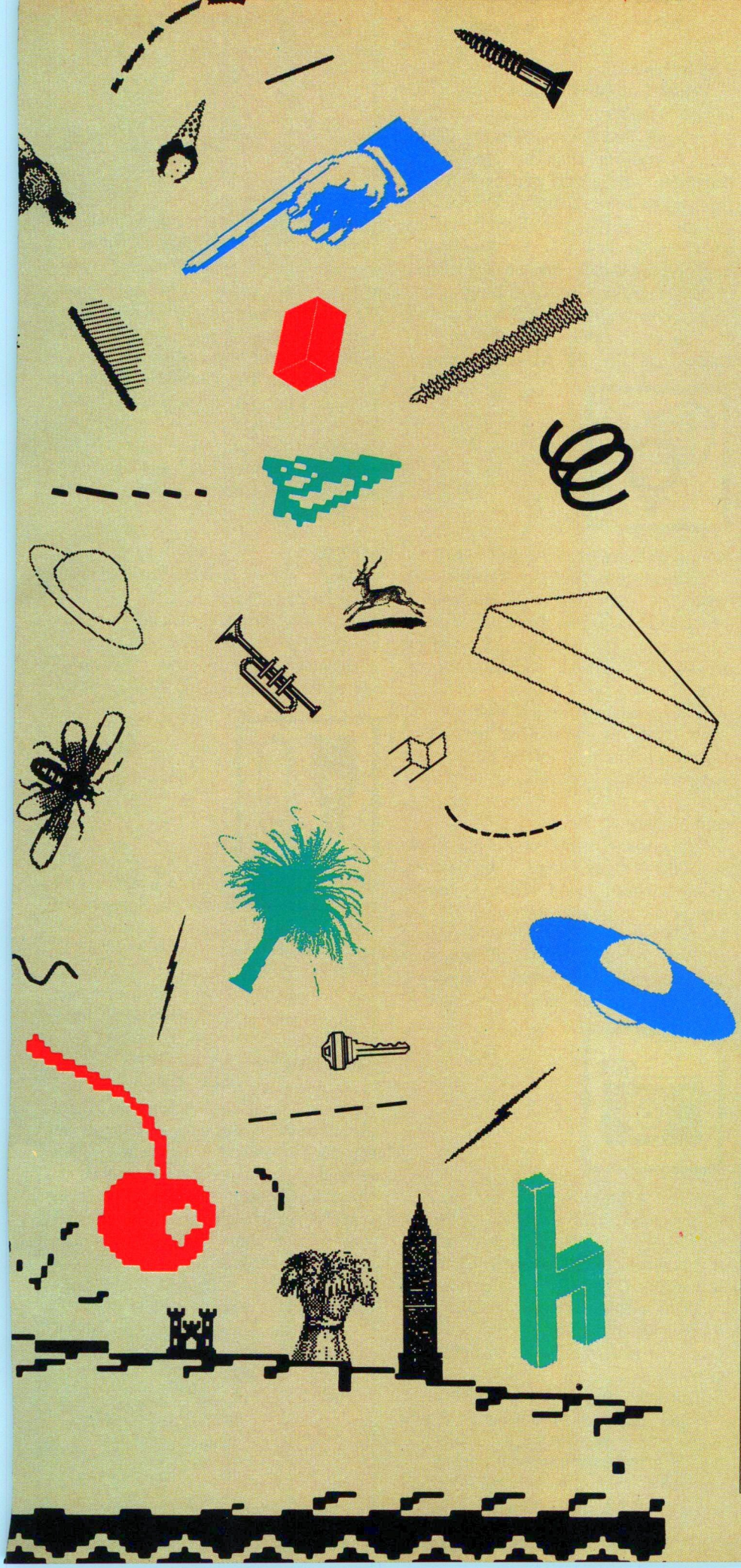


# Leave the Drawing to Us

## *Electronic clip art*

You are a businessperson issuing a sales report, or you're a teacher preparing a class handout, or the members of your organization are waiting for the latest newsletter, or you are designing invitations to a party, or perhaps you just love to doodle.

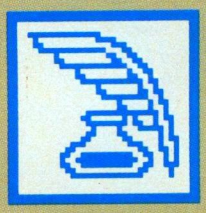
You bought a Macintosh because of its graphics abilities, but you don't have the artistic skill, or you just don't have the time. You need clip art.

**What Is Clip Art?**

Clip art is "ready-to-use" art. It consists of stylized "spot" drawings, old engravings, symbols, cartoons, signs, borders—any image that is in the public domain or has its copyright held by a publisher who offers the work, copyright-free, for the use of the purchasers of the book that contains the drawings. Clip art is used as is, or edited, for such diverse applications as decoupage, advertising, newsletters, and business and school publications.

The Macintosh computer, with its crisp black-and-white, high-resolution display, coupled with the Imagewriter's excellent merged text and graphics output, is sure to establish a demand for electronic clip art. Not surprisingly, four of the newest software packages for the Mac anticipate this demand.

JOHN HERSEY

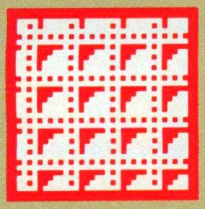


None of the four packages is copy-protected, and you need MacPaint and MacWrite to take full advantage of them.

## CLICKART

ClickArt comes in a blue plastic, 3½-inch disk case. A folded 12 × 14-inch sheet of paper fits within the confines of the box. One side of this paper is a poster with images from ClickArt, and the other side contains documentation on how to use the software.

The instructions are easy to follow, but you may find the tightly packed copy difficult to read. I caution you against following the direction to throw your scrapbook file into the trash so that you can put the ClickArt scrapbook onto your disk. Instead, rename your scrapbook file and store



it outside the system folder until you are sure you will not need the pictures it contains. In the world of computers, when in doubt, don't throw it out!

The ClickArt documentation urges you to use the program's drawings as they are or to use them as a starting point for your own creativity. Unfortunately, however, it does not give you any hints on *how* to use the drawings creatively.

Returning your registration card enrolls you in the ClickArt Users' Group, which entitles you to receive the *ClickArt Newsletter*. It contains examples and tips on ClickArt applications. Users who submit ideas that are published in the newsletter will receive the next ClickArt portfolio free.

### The Software

When I opened ClickArt, six folders, a MacWrite document, and a scrapbook icon spilled onto my desktop. Assuming that the MacWrite document contained pertinent information, such as a list of pictures and/or hints on how to use them, I ejected the ClickArt disk, inserted MacWrite, and opened the document. The object of my curiosity was nothing more than a copyright notice. I returned to my desktop, opened MacPaint, and looked at the 25 MacPaint docu-

ments. I discovered the following:

1. Titles often have nothing to do with the contents of a document. "Good Guys" offers three paper clips, four stars, a fountain pen, a pointing finger, RSVP, ASAP, and a border design. Good guys?
2. The images within a document seldom relate to each other in theme. "More Little Guys" offers an inflated frog, a rolled-up panda, an elephant, a large screw, two portraits of singers, and a vase.
3. The choice of subject and the quality of the art leave much to be desired.

How useful are a ¾-page rendering of an egret or portraits of Hart, Mondale, Jackson, and Boy George? I printed the document "Al and Jimmy" and asked three different people to identify the pictures. Everyone rec-

ognized Albert Einstein, but no one knew who "Jimmy" was. Jimmy who? Cagney? Walker? I don't know. If it is either one, why with Einstein? Indeed, why at all?

With a few exceptions, ClickArt's rough sketches and overworked portraits do not qualify as professional clip art.

### Summing Up

ClickArt may be adequate if you want pictures to "play" with. T/Maker's press release states that the company wanted its first collection of

images to be entertaining as well as useful. " . . . admit it. Part of the reason you bought your Macintosh was to have fun with it . . . So, take your Macintosh on a cruise through ClickArt, and enjoy. Aren't you glad you didn't buy a boring computer?"

I am glad that I bought a Macintosh, and I do have fun with it. I look forward to buying software that will add to the fun and usefulness of this exciting computer, but, from my point of view, as an artist, ClickArt has little to offer.

## MCPIC

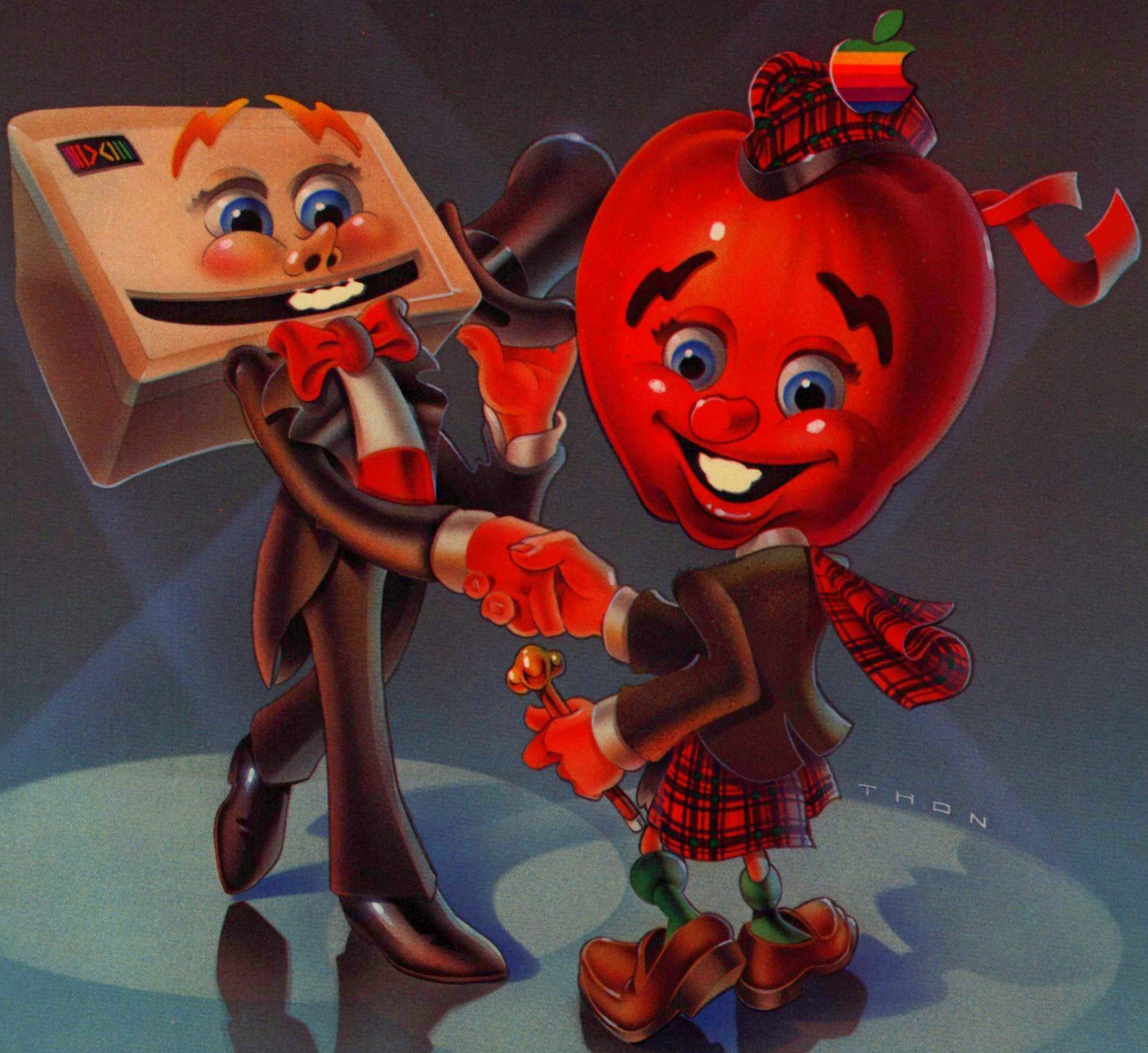
McPic comes boxed with an excellent 28-page manual that includes instructions on how to use the program, a list of categories and pictures within each category, and a section of ideas. In "Ideas" you'll find 29 fully

illustrated, step-by-step examples of how to alter and use the images on the disk. The suggestions should inspire experienced artists as well as novices. A section that is entitled "OOOPS!" lists some of the things that can go wrong and how to remedy them.

### The Software

When you open McPic, an open folder of scrapbook icons, arranged alphabetically, appears on the desktop. Unlike the other packages in this review, which supply their images on MacPaint documents, McPic uses scrapbooks, an approach that enables you to use these images with any Macintosh program that supports the Mac's standard Cut and Paste functions. You must copy one or more of the scrapbook files from the McPic

# Meet Your New Business Team. Macintosh & Davong.



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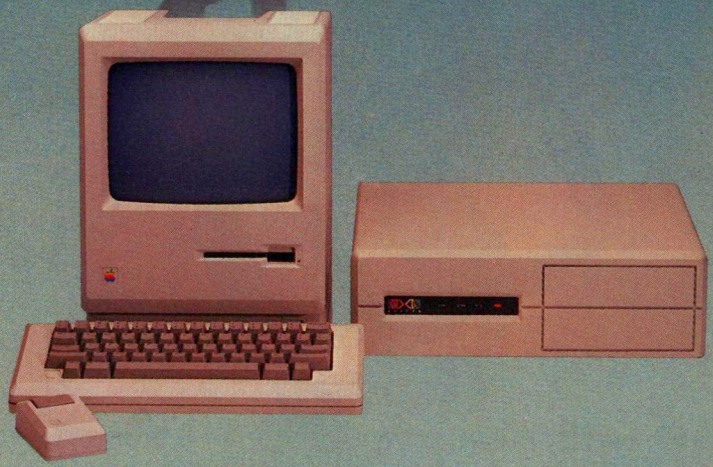
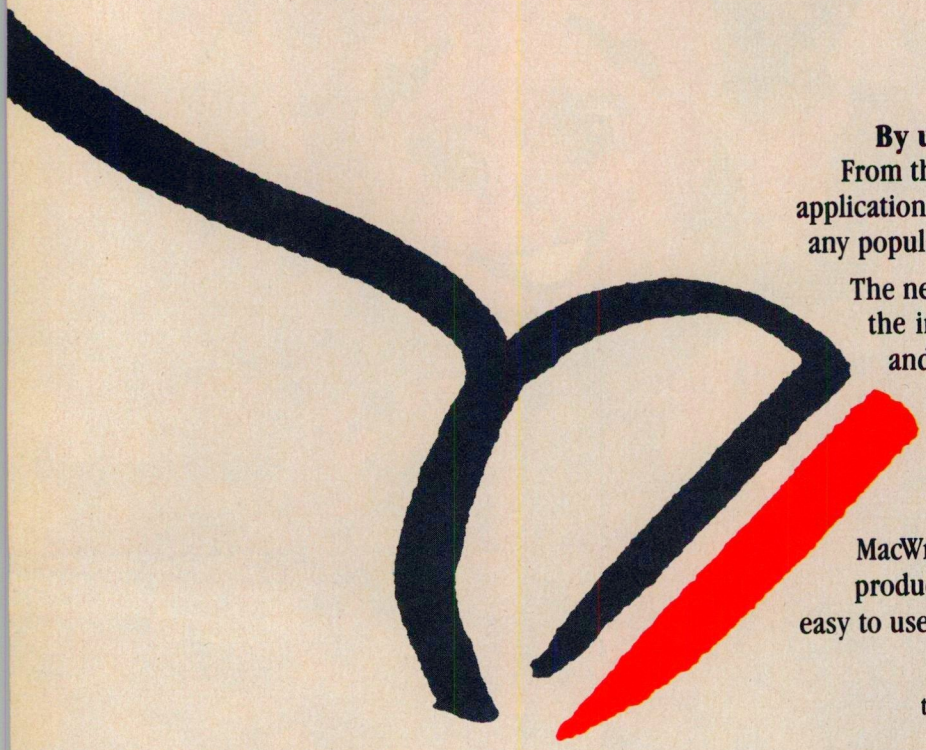


DAVONG

**Davong Systems, Inc.**
217 Humboldt Court
Sunnyvale, CA 94089
(408) 734-4900
Telex: 176386

CIRCLE 138 ON READER SERVICE CARD

# How can you get your Macintosh™ to print with a daisywheel, letter quality printer?



**By using the MAC · DAISYWHEEL · CONNECTION!**
From the team who wrote MacWrite™ comes a powerful application program that allows you to print your text with any popular daisywheel, letter quality printer.

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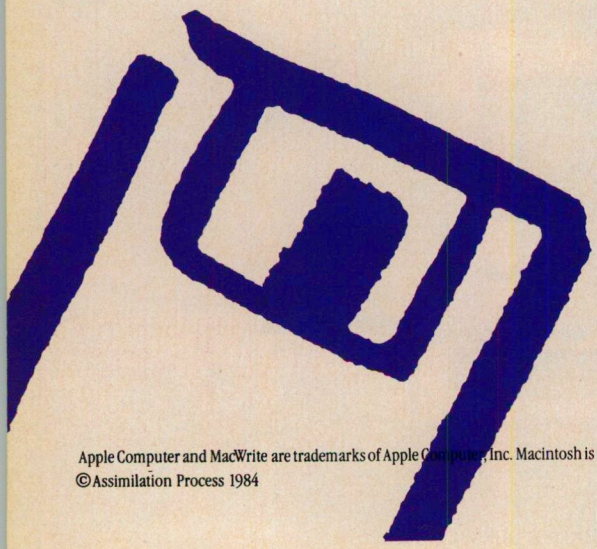
The MAC · DAISYWHEEL · CONNECTION supports MacWrite and Multiplan™ and other Macintosh software products. The MAC · DAISYWHEEL · CONNECTION is as easy to use as your Macintosh mouse. Just point and print!

The MAC · DAISYWHEEL · CONNECTION is now available through your local Apple Computer Dealer. List price $99.
Or call toll-free: 1-800-MAC-5464
In California, toll free: 1-800-421-0243
In Canada, direct-dial: 408-446-0797

Other quality products available from Assimilation Process:
- MAC · SPELL · RIGHT—Spelling checker program based on Webster's Dictionary, available now.
- MAC · TURBO · TOUCH—High speed input device for Macintosh, available next month.
- TEN-PACK of blank 3½″ diskettes for your Macintosh, available now.



**Assimilation Process™**

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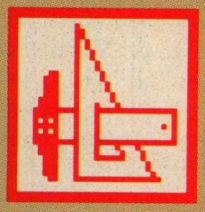
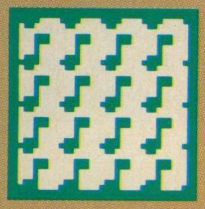


disk onto your program disk, however. The number of scrapbook files you can put on your disk at one time depends on how much room you have. Usually, you will need only one or two images from a scrapbook, so, after you have put the selected scrapbooks on your disk, you can page through them, clearing out the images you don't want. This technique leaves more room on your work disk—room you will need for MacPaint, MacWrite, and other files.

When you call for a scrapbook, the Finder gives you the one that is in the systems file of the *startup* disk, so you must replace that scrapbook file with one that you selected from McPic—a laborious process.

McPic has 12 scrapbooks, compiled by category, such as Business,



Nature, and People. The first page of each scrapbook displays a list of its contents. Images were pasted into the scrapbook with the lasso, so when you copy them onto your document, they are free-floating. Placing the images in the scrapbook has advantages and disadvantages.

**Summing Up**

McPic is well organized and documented. The images are, for the most part, professional in quality, useful, and receptive to MacPaint's editing options.

## MAC THE KNIFE

Mac the Knife is the most useful of the four packages in terms of providing borders and other images for business purposes, but it still needs improvement and is not as well rounded as McPic.

The manual is thorough, with step-by-step instructions for using the images in Mac the Knife, as well as hints on using the Macintosh in general. Occasionally, the style of writing gets "friendly" in a way that I find unappealing, out of context, and particularly inappropriate for professional application software.

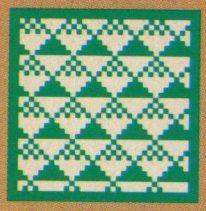
**The Software**

Mac the Knife is more a package of graphic aids than a clip-art package. It has 18 MacPaint documents, each including a unique set of fill-pattern

textures (all of the figures on this and the preceding page are from Mac the Knife documents). Two documents contain enough border designs to satisfy anyone's needs. The page of corporation symbols and two pages of international icons should be useful for certain business applications. The package includes two new fonts, as well as an enhanced version of New York, called Manhattan, which adds new option-key characters—every icon from MacPaint and MacWrite. The inclusion of new fonts is one of the best features of Mac the Knife. One of the fonts must have been included at the last minute, since it is not mentioned in the manual, nor does it appear on the document called Font Charts. Paint Tools has rulers for use with MacPaint documents, blank

diskette labels, and a blank "pattern chart."

The "friendliness" of the documentation carries over into the software. Gallery #2 has an amateurish rendering of a clown credited to the contributor with this annotation: "When I saw the balloons in the MacPaint manual, I just knew they had to have a clown at the other end of their strings." A picture of an invitation, on Gallery #3, invites users to contribute to future volumes of Mac the Knife. Artists whose work is chosen will re-



ceive $20 and a free copy of the volume in which their work appears. Volume 2 of Mac the Knife will contain 30 to 50 new fonts.

**Summing Up**

Mac the Knife has the potential to be an excellent package, but it has room for improvement. The documentation especially needs some work and shouldn't be "cutesy."

## CLIP 1

I received a prototype of CLIP 1 for this review. The disk contents were finalized, but the manual was incomplete.

**The Documentation**

According to the publisher of the software, each CLIP product will include a disk in a plastic holder, in a high-quality, three-ring, loose-leaf binder. Each disk will include print-

ed, categorized images, and each manual will include some practical Mac instructions, describe new Mac tricks, and offer suggestions for using the contents of that CLIP disk.

**The Software**

Future CLIP products will contain original Mac art as well as digitized images, but all the images in CLIP 1 are digitized, meaning that they are not original drawings contributed by artists working on the Macintosh. Instead, the images are photographs that are broken down with special equipment from shades of gray into pixels and then translated to the computer screen. If you have seen T-shirts with photographs of people on them, then you have seen digitized art.

The advantage to using digitized art is obvious: It allows you to use the

infinite number of printed images that are already available, as well as actual photographs of people, places, and objects. In the Luna folder, for example, we get photographs of the first moon walk. The old etchings of flora and fauna, reproduced in Plants and Animals, can never find their equal in contemporary renderings. The manual credits some of the images to Dover Books and Hart Publications, well-known publishers of clip art.

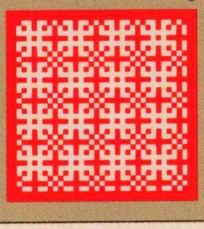
Using digitized art also has its disadvantages. Digitizing an image breaks it down into dots, resulting in pictures that are not as "clean" or sharp as line drawings, nor as conducive to MacPaint manipulating. Recognizing that filling these dotted images with patterns would be impossible (the patterns would spill out through the spaces between the dots), the publisher added "fill-corrected" versions. I recommend leaving these images intact, rather than shrinking, stretching, and otherwise playing with them.

**Summing Up**

If you are looking for miniature engravings to enhance your Macintosh documents, CLIP 1 will start off your collection. This package does not contain the arrows, borders, and symbols commonly associated with clip art, but it will definitely add class to your letters, bulletins, and other documents.

**CONCLUSIONS**

I am an artist and have set high standards for judging the software packages here. If I were looking at them as Macintosh art galleries—"See what people can draw with a Mac"—I would be less critical, but the software is being released as electronic clip art. When we purchase software, we have every right to expect that the package will contain exactly what it advertises. Clip art must be useful, or its purpose is negated.



Opening and closing documents or moving and renaming scrapbooks to get pictures onto the clipboard is tedious and time-consuming. One method isn't necessarily better than the other. You will probably find it less intimidating to work with MacPaint documents than to remove scrapbook files from the system folder and replace them. With the current memory restrictions of the Mac, I doubt that a more elegant solution to the problem is possible.

To find particular images in these packages, you have to look through a MacPaint catalog that shrinks and merges each document onto a single page, resulting in indistinct images. A full-page printout of each document would be more useful.

Documents that contain images that are related in theme and consistent with the titles of the document are the easiest to use. When you need pictures of animals, you should not have to open three or four files to get all the animals offered.

None of the packages mentioned here includes all the existing types of clip art, so none will fulfill all of your clip-art needs. McPic has an assortment of images that are most condu-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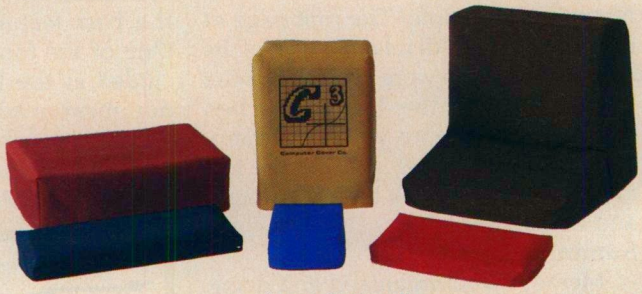

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **OMNIS 1** | **$95** | **unlimited** | **120** | **1** | **3000** | **yes** | **yes** | **no** | **menu** | **yes** | **1,2,3,4** | **yes** |
| PFS-File™ | 120 | 32K | 32 | 1 | 1600 | no | no | no | menu | no | 1,2,3,4 | no |
| PFS-Report™ | 120 | -0- | -0- | -0- | -0- | no | Report only | no | menu | no | 1,2,3,4 | no |
| **OMNIS 2** | **195** | **unlimited*** | **120** | **1** | **9600** | **yes** | **yes** | **no** | **menu** | **yes** | **1,2,3,4,5,6** | **yes** |
| Database Manager II | 295 | unlimited* | 40 | 1 | 2400 | no | yes | no | menu | yes | 1,2 | no |
| DB Master™ App.<br>IBM | 350<br>595 | 250K<br>1000K | 100<br>250 | 1<br>1 | 1020<br>3000 | no<br>no | yes<br>yes | no<br>no | menu<br>menu | yes<br>no | 3,4<br>1,2 | no<br>no |
| **OMNIS 3** | **295** | **unlimited** | **1440** | **12** | **25000** | **yes** | **yes** | **yes** | **menu** | **yes** | **1,2,3,4,5,6** | **yes** |
| dBase™II | 695 | 65K | 32 | 2 | 1000 | no | yes | yes | comm | yes | 1,2,3,4 | no |
| CONDOR™3 | 650 | 64K | 127 | 6 | 1024 | no | yes | no | comm | no | 1,2,3,4 | no |
| R:BASE™ 4000 | 495 | unlimited | 400 | 40 | 1530 | no | yes | yes | menu | yes | 1,2 | no |

*Limited only by disk capacity  Chart compiled from published information

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cive to manipulation with MacPaint—it has enough of a variety to satisfy most needs. CLIP 1's images are consistent with classic clip art, but this volume does not contain the arrows, borders, and symbols that many users will probably want to enhance business reports, newsletters, and the like. Mac the Knife has good borders, symbols, and fonts, but not many "pictures." It is the most eclectic package of the four. ClickArt is a portfolio of pictures, with limited use.

If you can use clip art, you may want to select one or two of these packages to start your collection and then wait to see what the second volume of each has to offer.

**ADDENDUM**

At the time I was writing this article, releases of two other clip-art packages, Cut'N'Paste from Dreams of the Phoenix and Art Portfolio from Axlon, were announced. Christopher Allen, of Dreams of the Phoenix, informed me that Cut'N'Paste was not yet ready for review. According to Allen, each volume will be faithful to the tradition of clip art and will feature a specific subject, such as people, nature, or computers. The publisher is planning noncommercial distribution—i.e., it will encourage users to copy and distribute the software to friends and colleagues, expecting that those who receive a copy will send in the requested users' fee. Diversi-dos, for the Apple II line of computers, is distributed this way.

Art Portfolio from Axlon contains more than 120 images and symbols. It has a 150-page spiral-bound manual that has reproductions of the images on the diskette, as well as tips and instructions on using the images for creating greeting cards. +

## PRODUCT INFORMATION

**ClickArt**
T/Maker Graphics Company
2115 Landings Drive
Mountain View, CA 94043
(415) 962-0195
**List Price:** $49.95

**McPic**
Magnum Software
21115 Devonshire Street, Suite 337
Chatsworth, CA 91311
(818) 700-0510
**List Price:** $49.95

**Mac the Knife**
Miles Computing, Inc.
7136 Haskell Avenue
Suite 300
Van Nuys, CA 91406
(818) 994-7901
**List Price:** $39 (available by subscription at a discounted price)

**CLIP 1**
Frazier, Peper & Associates
P.O. Box 3019
Santa Cruz, CA 95063
(408) 476-2358
**List Price:** $29.95 (Series discounts and subscriptions will be offered.)

**Cut'N'Paste**
Dreams of the Phoenix, Inc.
P.O. Box 10273
Jacksonville, FL 32247
(904) 396-6953
**List Price:** $39.95 (available by subscription—six volumes for $199)

**Art Portfolio**
Axlon, Inc.
1287 Lawrence Station Road
Sunnyvale, CA 94089
(408) 747-1900
**List Price:** $59.95


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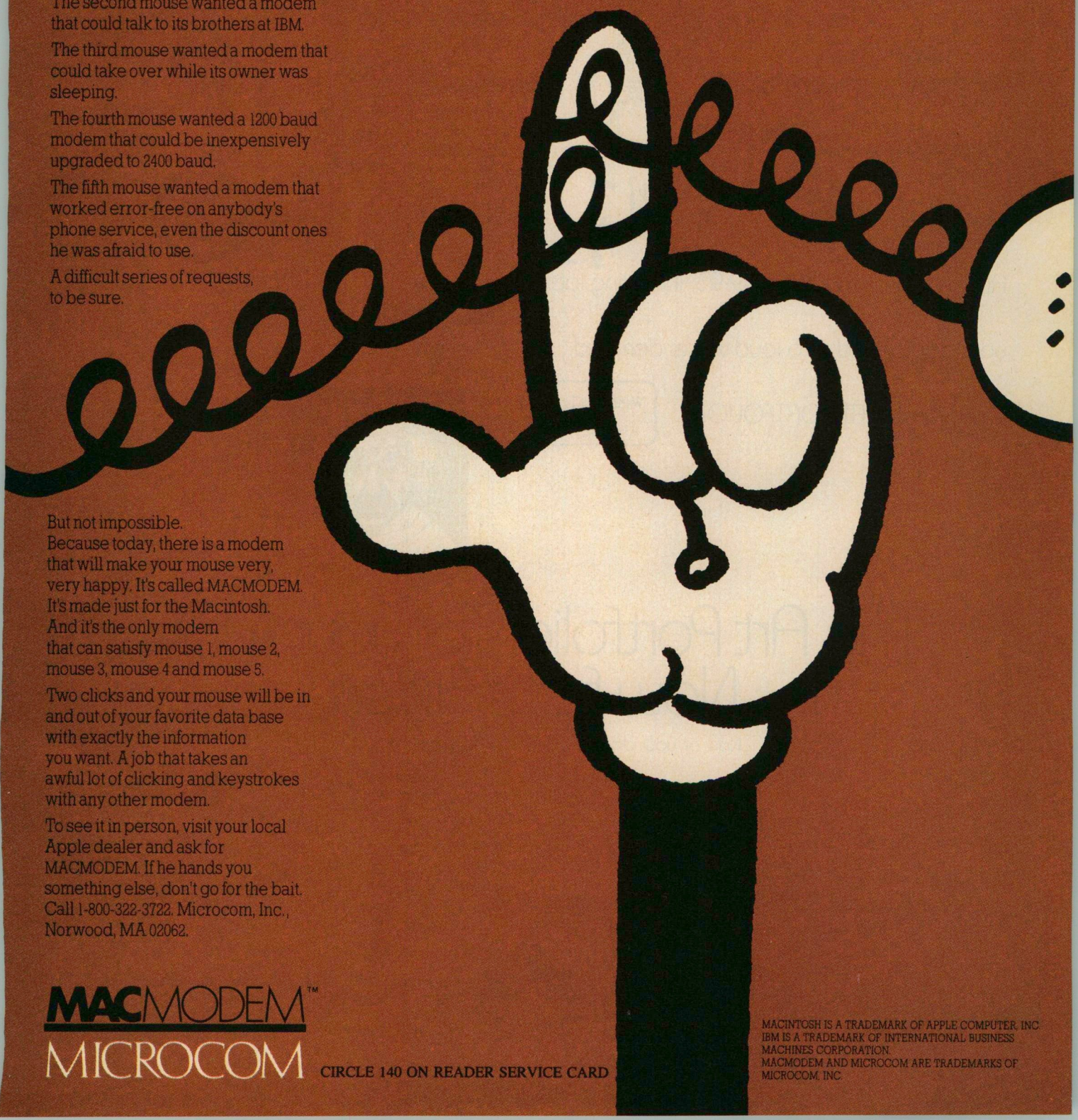
The second mouse wanted a modem that could talk to its brothers at IBM.

The third mouse wanted a modem that could take over while its owner was sleeping.

The fourth mouse wanted a 1200 baud modem that could be inexpensively upgraded to 2400 baud.

The fifth mouse wanted a modem that worked error-free on anybody's phone service, even the discount ones he was afraid to use.

A difficult series of requests, to be sure.



But not impossible.
Because today, there is a modem that will make your mouse very, very happy. It's called MACMODEM. It's made just for the Macintosh. And it's the only modem that can satisfy mouse 1, mouse 2, mouse 3, mouse 4 and mouse 5.

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**MACMODEM™**

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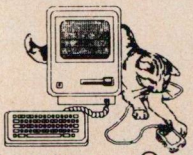
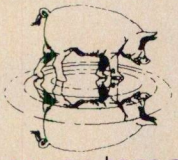
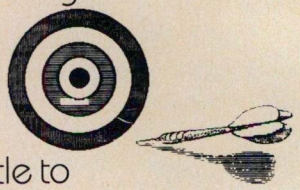
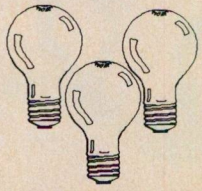
Yeah for MacPaint™! But boo! Most of us draw like this: So Hooray for Axlon's new Art Portfolio! Over 120 art elements to create with  and lots of tips, hints and examples to jazz your imagination. A veritable of ideas. For letterheads,

announcements,

weight-watchers,  telling people where to go, or keeping them on target.  All on disk, all for only $59.95, including lots of  So hustle to your dealer and, in a loud voice, demand:

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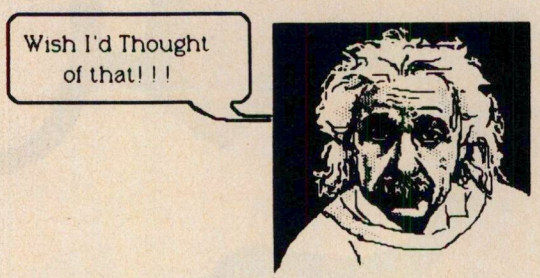


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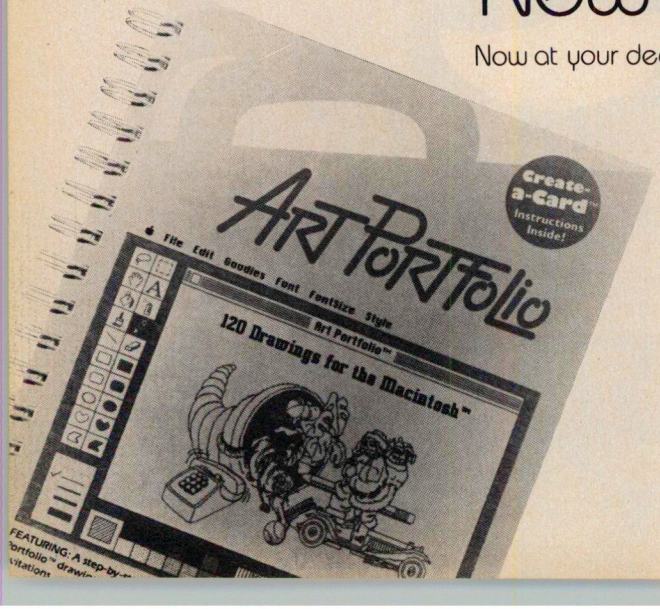


AXLON®

Note: All Art Portfolio contains original artwork handdrawn by a professional commercial artist using MacPaint™ on the Macintosh.™

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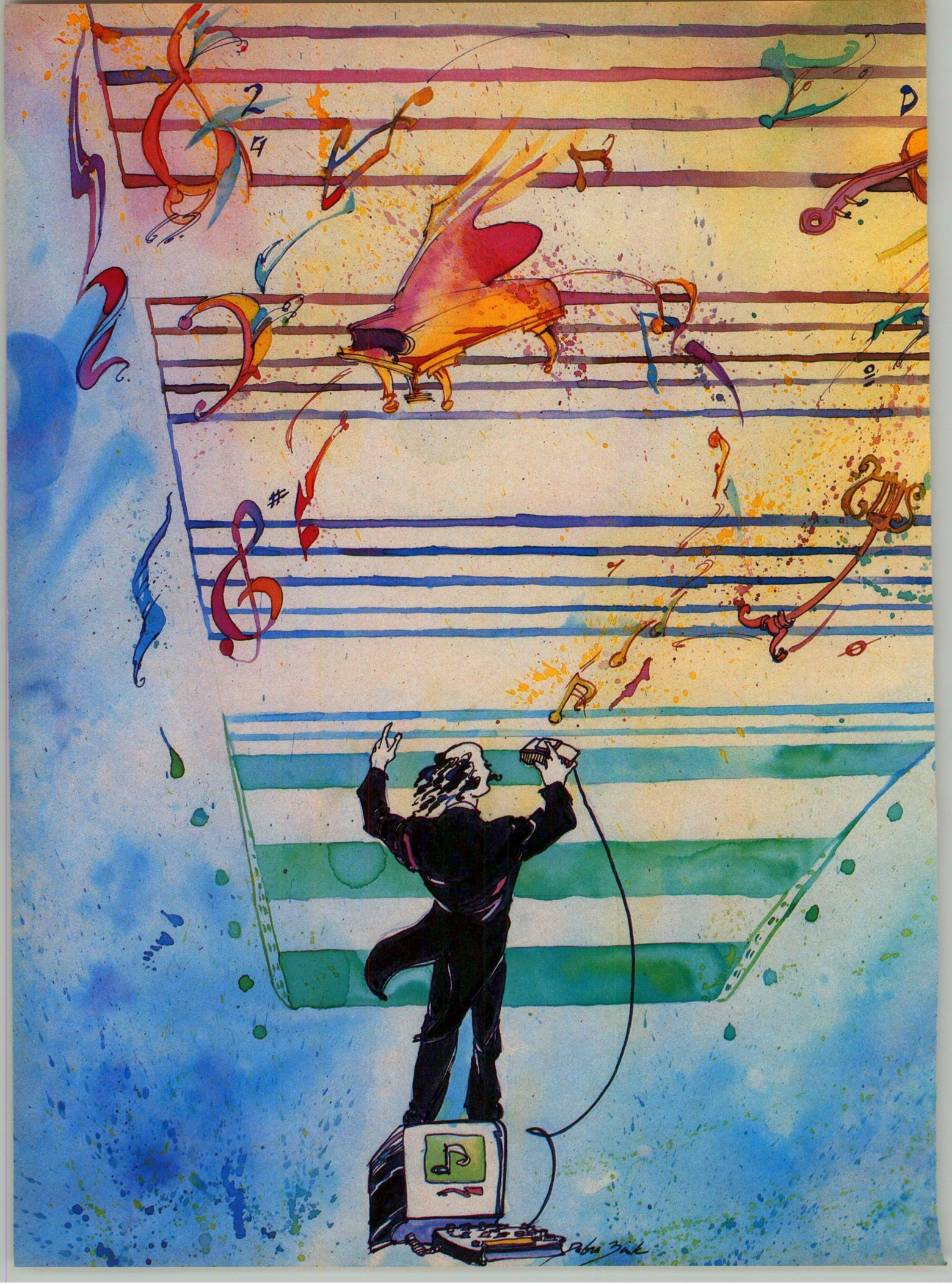

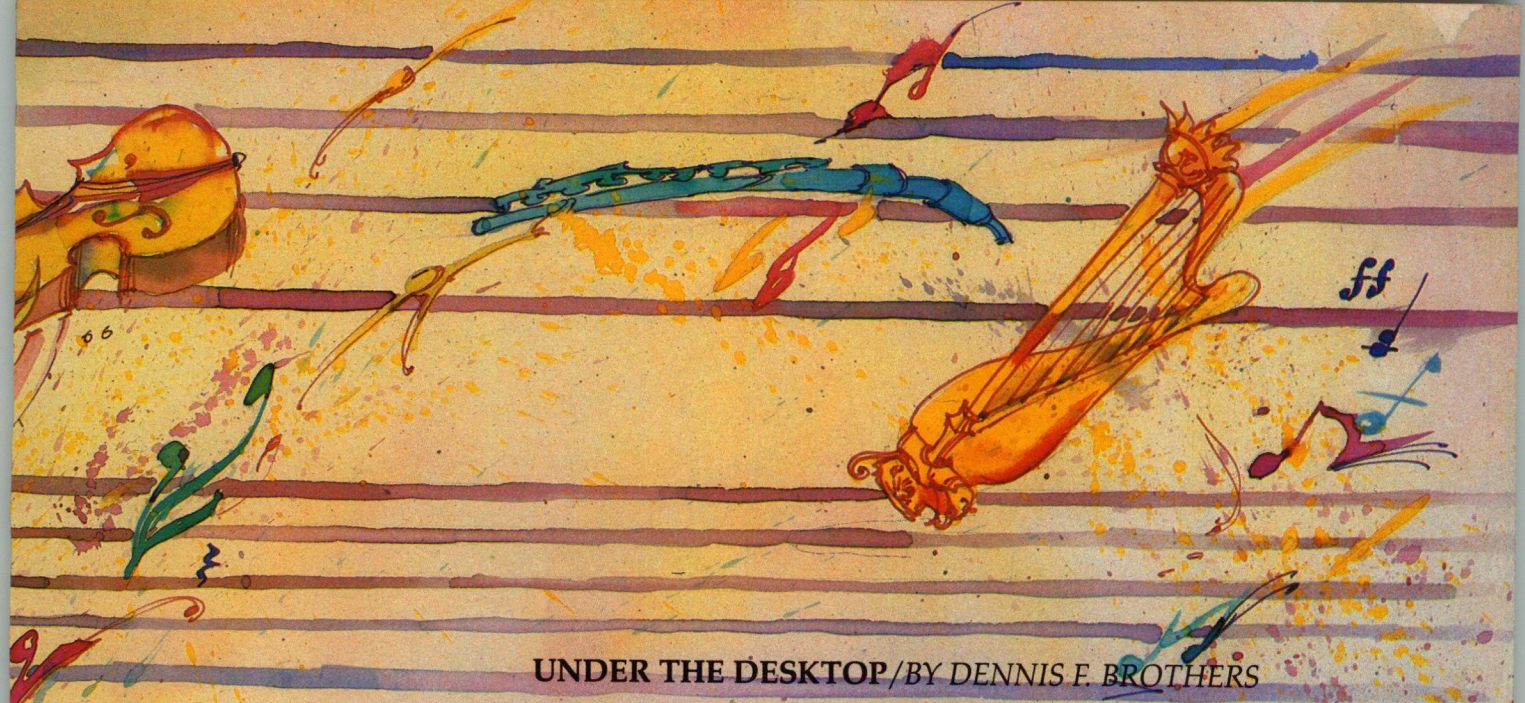

**UNDER THE DESKTOP**/*BY DENNIS F. BROTHERS*

# I'd Like to Teach the Mac to Sing

## . . . *in perfect harmony*

In August's Under the Desktop column ("The Mac Makes Music"), I described the three sound-synthesizer modes of the Macintosh (free-form, square-wave, and four-tone) and presented programs that demonstrated the free-form and square-wave techniques. This month I offer a program that demonstrates the Mac's four-tone capability (see listing, page 114).

The designers of the Macintosh put serious effort into the Mac's sound system, and the four-tone synthesis system emerges as a tour de force. I know of no other microcomputer that provides so much flexibility and control over the factors involved in generating music. You can program the Mac to produce music with up to four simultaneous parts or voices, with independent control over the waveform of each part.

You specify these waveforms in a general way, as an envelope, or shape, for one complete cycle of the wave. Thus, you can set up an almost unlimited range of waveshapes, and

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*I know of no other microcomputer that provides so much flexibility and control over the factors involved in generating music.*

therefore sound qualities, from simple square-wave (organ-like) or sine-wave (flute-like) tones to complex mixtures of fundamental and harmonic tones, mimicking a wide range of musical instruments.

The program I present here plays a familiar tune in four-part harmony, with different "voices" in the melody and each harmony part. You can easily modify it to play a different tune and to use different waveshapes for the parts. For the details of the interface to the Macintosh sound system, see "The Mac Makes Music," *A+*, August 1984 (page 74).

Lines 2000 through 2200 of the program build a table of note rates (which you use to specify the pitch of each note) corresponding to the 88 keys of the standard piano keyboard. All note frequencies (pitches) are derived mathematically from the international standard of 440 Hz for A above middle C, with equal tempering.

Program lines 3000 through 3420 create a set of waveform tables, with various shapes. Sine, square, and triangle waves are set up (the latter have a stringlike quality), and lines 3350 through 3410 create a sine-wave fundamental plus third-harmonic wave, as an example of a more complex waveform. Later in the program, you'll find references by name to these waveform tables. Modifying one of the supplied waveforms or adding new ones is easy.

Lines 4000 through 4210 create tables that you'll use to "compile" the music to be played, translating it from a natural notation of note letters, accents, and so forth into the numeric form that the program needs in order to play the music. Lines 5000 through 5230 do the actual compiling, reading the music from DATA statements at the end of the program, producing a list of note durations in the array DURLIST, and creating a list of "step-rate" quadruplets (which specify the pitch of each of the four tones) in the array TONELIST.

In lines 6000 through 6260, the data structures required for playing the music—parameter lists and synthesizer records—are set up. The program creates two of each, so that when the Mac plays the music, one set can be playing while the other is being set up with the data for the next note. This technique is necessary because the four-tone synthesizer plays only one note (comprising four parts) each time it is called. We'd get an undesirable staccato effect if we played a note, then computed the next one, then played a note, and so on. Use of the Macintosh asynchronous Write ROM call (see my August column) makes it easy to overlap playing and computing the next note.

Lines 6210 through 6240 are where you specify the waveform that corresponds to each part—just edit in different waveform table names to change the "voicing" of the program.

Lines 7000 through 7220 are where the action is. This section of the program plays the music, advancing through the duration and note lists and calling the four-tone synthesizer. If you decide to incorporate four-tone sound into another program, restructure these lines as a subroutine and call them when you want to play a tune.

Lines 8000 through 8350 set up the machine-language subroutines that provide word (two-byte) and longword (four-byte) peeks and pokes and that provide the interface between BASIC and the Write function in ROM for invoking the sound synthesizer.

If you modify the program, don't introduce any new variables within lines 6060 through 6260, or within lines 7020 through 7220. A new variable would cause all the BASIC arrays to move in memory and invalidate the pointers that are set up at the beginning of these sections of code. If you need a new variable, initialize it (to a dummy value, if necessary) outside of those sections.

The section of the program that starts on line 9000 contains the coded representation of the music to be played—the REM statements at the beginning describe the coding scheme and format. When the tune I've provided begins to drive your family to thoughts of MacSabotage, just replace the DATA statements with a new tune. If you code a tune with more than 300 notes, the array sizes in line 1140 will have to be increased to accommodate the longer tune, and the CLEAR statement in line 1090 may need modification to clear more memory space. The program may become too large for you to execute directly by double-clicking it from the desktop. If that happens (as indicated by an Out of memory at line 0 message when you try to run the program), you'll have to set up a "runner" program. Assuming you've saved the program under the name Four-tone, create another BASIC program consisting of the following two lines:

```
10 CLEAR ,20000
20 RUN "Four-Tone"
```

Save it under the name Four-Tone Runner. (If you've increased the CLEAR size in the main program, modify line 10 of the runner program correspondingly). Then just double-click on Four-Tone Runner to run the program.

Another idiosyncrasy of the Macintosh that has just surfaced is that the modem port somehow interferes with the music programs. To avoid problems, make sure nothing is plugged into the modem port and turn the Mac off before running the program. I'll be investigating this irregularity, so check my future columns for a further discussion of the problem.

If you have any comments on this column, or Macintosh tips or techniques to pass on, write me care of *A+* (11 Davis Drive, Belmont, CA 94002), or send me electronic mail via CompuServe (ID 70065,172) or MCI Mail (ID DBROTHERS).

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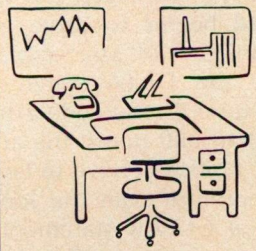

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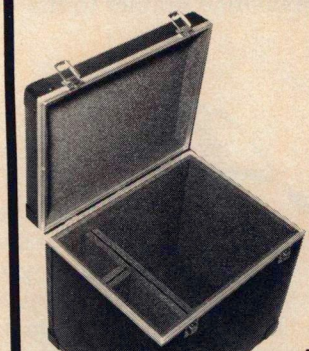

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# Four-Tone Synthesizer Music Demonstration

```
1000 CLS: PRINT
1010 PRINT "   Macintosh Four-Tone Synthesizer Music Demonstration"
1080 PRINT "Initializing - Please wait....."
1090 CLEAR ,20000
1100 DEFINT A-Z  '  Default to integers for speed and space
1110 DIM PARAMLIST(49\2, 1)  '  Standard ROM Write parameter lists
1120 DIM SYNTHREC(2, 1)  ' Mode word and pointer to sound record
1130 DIM SOUNDREC(24,1) ' Duration wrd, 4 long-wrd triplets (tone, phase, wave)
1140 DIM DURLIST(300), TONELIST(1,3,300)  ' lists of durations and tones to play
1150 TP1!=0: TP2!=0  '  temporary pointers for later use
1160 REM
1170 GOSUB 8000  '  Go initialize the machine-language subroutines
1180 REM
2000 REM  Build the tone frequency table
2010 REM
2020 PRINT: PRINT "    Building tone tables....."
2030 DIM NOTEFREQ#(87)  '  Simulate a piano keyboard (88 keys)
2040 HALFSTEP#=2#^(1#/12#)  '  ratio of musical half-step
2050 NOTEFREQ#(0)=440#/16#  '  4th A below middle C (A above middle C = 440 Hz)
2060 FOR I=1 TO 11
2070    NOTEFREQ#(I)=NOTEFREQ#(I-1)*HALFSTEP#  '  fill in base octave
2080    NEXT I
2090 FOR I=12 TO 87
2100    NOTEFREQ#(I)=NOTEFREQ#(I-12)*2#  '  fill in rest of array
2110    NEXT I
2120 REM
2130 REM  Set up table of synthesizer step rates corresponding to frequencies
2140 DIM NOTERATE(1,87)
2150 STEPSPERHZ#=(256#*(704#/15667200#))
2160 FOR I=0 TO 87
2170    RATE#=NOTEFREQ#(I)*STEPSPERHZ#*65536#
2180    LPOKE!=FNCODE!(LPOKE): CALL LPOKE!(VARPTR(NOTERATE(0,I)), RATE#)
2190    NEXT I
2200 REM
3000 REM  Build various waveform tables
3010 REM
3020 PRINT: PRINT "    Building waveform tables....."
3030 REM
3040 REM  Set up a square-wave waveform table
3050 DIM WAVESQUARE(127)
3060 FOR I=0 TO 127
3070    POKE VARPTR(WAVESQUARE(0))+I,255
3080    NEXT I
3090 FOR I=128 TO 255
3100    POKE VARPTR(WAVESQUARE(0))+I,0
3110    NEXT I
3120 REM
3130 REM  Set up a triangle-wave waveform table
3150 DIM WAVETRIANG(127)
3160 FOR I=0 TO 63
3170    POKE VARPTR(WAVETRIANG(0))+I,128+(I*2)
3180    NEXT I
3190 FOR I=64 TO 191
3200    POKE VARPTR(WAVETRIANG(0))+I,255-((I-64)*2)
3210    NEXT I
3220 FOR I=192 TO 255
3230    POKE VARPTR(WAVETRIANG(0))+I,(I-192)*2
3240    NEXT I
3250 REM
3260 REM  Set up a sine-wave waveform table
3280 DIM WAVESINE(127)
3290 PI#=3.14159265#
3300 FOR I=0 TO 255
3310    AMPLITUDE#=SIN((I/256#)*2#*PI#)
3320    POKE VARPTR(WAVESINE(0))+I,FIX(127.5#+AMPLITUDE#*127#)
3330    NEXT I
3340 REM
3350 REM  Set up a fundamental plus third-harmonic waveform table
3370 DIM WAVETHIRD(127)
3380 FOR I=0 TO 255
3390    AMPLITUDE#=(SIN((I/256#)*2#*PI#)+SIN(((I*3)/256#)*2#*PI#))/2#
3400    POKE VARPTR(WAVETHIRD(0))+I,FIX(127.5#+AMPLITUDE#*127#)
3410    NEXT I
3420 REM
4000 REM  Build the note translation table
4010 REM
4020 PRINT: PRINT "    Building translation tables....."
4030 DATA "CDEFGAB0123456789%": REM note names, octave numbers, accents
4040 DATA 0,2,4,5,7,9,11:  REM relative positions of unaccented notes
4050 DATA -9,3,15,27,39,51,63,75,87:  REM locations of octave beginnings
4060 DATA +1,-1:  REM biases for accents (sharp and flat)
4070 RESTORE 4000
4080 READ NOTENAMES$
4090 DIM NOTEINDEX(LEN(NOTENAMES$))
4100 FOR I=1 TO LEN(NOTENAMES$)
4110    READ NOTEINDEX(I)
4120    NEXT I
4130 REM
4140 REM  Build duration table
4150 DURNAMES$="SEQHW"  '  duration names (Sixteenth thru Whole)
4160 DIM DURVALUE(LEN(DURNAMES$))
4170 DURVALUE(1)=1  '  relative length of a sixteenth note
4180 FOR I=2 TO LEN(DURNAMES$)
4190    DURVALUE(I)=DURVALUE(I-1)*2  '  each duration is 2X the previous
4200    NEXT I
4210 REM
5000 REM  Compile the music into duration and tone lists
5010 REM
5020 PRINT: PRINT "Compiling music....."
5030 RESTORE 9000
5040 READ TEMPO
5050 TICKSPER16TH=900/TEMPO  '  translate tempo to ticks per sixteenth-note
5060 LISTPTR=0
5070 DURLIST(LISTPTR)=0  '  zero will terminate list
5080 READ DURATION$: IF DURATION$="X" THEN GOTO 6000  '  end of music data
5090 DURLIST(LISTPTR)=TICKSPER16TH*DURVALUE(INSTR(DURNAMES$,DURATION$))
5100 FOR I=0 TO 3  '  loop to process four tones
5110    READ NOTE$: IF NOTE$<>"R" THEN GOTO 5140  '  not a rest
5120    LPOKE!=FNCODE!(LPOKE)  '  about to set up a rest
5130    CALL LPOKE!(VARPTR(TONELIST(0,I,LISTPTR)), 0!): GOTO 5200
5140    INDEX=0  '  process a note - initialize index value
5150    FOR J=1 TO LEN(NOTE$)  '  build index value from note characters
5160       INDEX=INDEX+NOTEINDEX(INSTR(NOTENAMES$,MID$(NOTE$,J,1)))
5170       NEXT J
5180    LPEEK!=FNCODE!(LPEEK)  '  about to put tone value in play list
5190    CALL LPEEK!(VARPTR(TONELIST(0,I,LISTPTR)), VARPTR(NOTERATE(0,INDEX)))
5200    NEXT I
5210 LISTPTR=LISTPTR+1  '  advance to next element of play list
5220 GOTO 5070
5230 REM
6000 REM  Set up four-tone sound data structures
6010 REM
6020 PRINT: PRINT "    Setting up sound data structures....."
```

```
6030 REM
6040 FOR BUFNUM=0 TO 1     two buffers so we can play one while diddling other
6050    REM  Set up four-tone sound Write parameter list
6060    LPOKE!=FNCODE!(LPOKE)
6070    REM  IMPORTANT:  NO NEW VARIABLES MAY BE USED AFTER THIS POINT
6080    REM
6090    FOR I=0 TO 49\2: PARAMLIST(I, BUFNUM)=0: NEXT I
6100    PARAMLIST(24\2, BUFNUM)=-4  '  Sound reference number
6110    CA! L POKE!(VARPTR(PARAMLIST(0,BUFNUM))+32, VARPTR(SYNTHREC(0,BUFNUM)))
6120    CALL LPOKE!(VARPTR(PARAMLIST(0, BUFNUM))+36, 6!)  ' 4-t rec. is 6 bytes
6130    REM
6140    REM  Set up four-tone synthesizer record
6150    SYNTHREC(0, BUFNUM)=1  '  Positive number (>0) indicates four-tone
6160    CALL LPOKE!(VARPTR(SYNTHREC(1, BUFNUM)), VARPTR(SOUNDREC(0, BUFNUM)))
6170    REM
6180    REM  Set up four-tone sound record
6190    FOR I=0 TO 24: SOUNDREC(I, BUFNUM)=0: NEXT I
6200    REM Select a wave pattern for each synthesizer voice
6210    CALL LPOKE!(VARPTR(SOUNDREC(17, BUFNUM)), VARPTR(WAVETHIRD(0)))
6220    CALL LPOKE!(VARPTR(SOUNDREC(19, BUFNUM)), VARPTR(WAVETRIANG(0)))
6230    CALL LPOKE!(VARPTR(SOUNDREC(21, BUFNUM)), VARPTR(WAVETRIANG(0)))
6240    CALL LPOKE!(VARPTR(SOUNDREC(23, BUFNUM)), VARPTR(WAVETRIANG(0)))
6250    NEXT BUFNUM
6260 REM
7000 REM  Play the music from the lists
7010 REM
7020 LPEEK!=FNCODE!(LPEEK): IOWRITEASYNC!=FNCODE!(IOWRITEASYNC)
7030 PRINT: PRINT "Playing music."
7040 LISTPTR=0: BUFNUM=0  '  start at beginning of play list; first buffer
7050 WHILE DURLIST(LISTPTR)<>0  '  zero duration ends list
7060    BUFNUM=1-BUFNUM  '  switch buffers
7070    WHILE PARAMLIST(16\2, BUFNUM)<>0: WEND  ' Wait for next buffer available
7080    SOUNDREC(0, BUFNUM)=DURLIST(LISTPTR)  '  set duration of next note
7090    FOR I=0 TO 3  '  process four voices
7100       TP1!=VARPTR(SOUNDREC(1+I*4, BUFNUM))
7110       TP2!=VARPTR(TONELIST(0,I,LISTPTR))
7120       CALL LPEEK!(TP1!, TP2!)  '  put tone in sound record
7130       NEXT I
7140    CALL IOWRITEASYNC!(VARPTR(PARAMLIST(0, BUFNUM)))  '  play the notes
7150    LISTPTR=LISTPTR+1  '  next item in list
7160    WEND
7170 WHILE PARAMLIST(16\2, BUFNUM)<>0: WEND  '  Wait for final note to end
7180 REM
7190 PRINT: PRINT "Press a Key to play again..."
7200 WHILE INKEY$="": WEND  '  wait for a Keypress
7210 GOTO 7000
7220 REM
8000 REM  Initialize the machine language subroutines
8010 REM
8020 REM   HEX (Intel format) data for machine-language subroutines
8030 DATA "1C000000000C002000300044005400624E560000206E0008301020 6E000C3080CA"
8040 DATA "1C001C004E5E4E754E560000206E000A30AE00084E5E4E754E560000206E00088E"
8050 DATA "1C003800201020 6E000C20804E5E4E754E560000206E000C20AE00084E5E4E7550"
8060 DATA "1C0054004E560000206E0008A0034E5E4E754E560000206E0008A4034E5E4E75F4"
8070 DATA "000000000000"
8080 REM
8090 DIM CODEARRAY(200)
8100 DEF FNCODE!(OFFSET)=VARPTR(CODEARRAY(0))+OFFSET
8110 RESTORE 8030  '  Restore to machine-language HEX data statements
8120 MLLINE=8030  '  First DATA statement line number
8130 READ ML$  '  Read next line of HEX data
8140 MLCHK=0  '  Initialize checksum
8150 FOR I=1 TO LEN(ML$)-1 STEP 2  '  Scan by bytes (pairs of hex digits)
8160    MLCHK=(MLCHK+VAL("&H"+MID$(ML$,I,2))) MOD &H100'  Compute checksum
8170    NEXT I
8180 IF MLCHK<>0 THEN CLS: PRINT CHR$(7);"Error in ML line ";MLLINE: STOP
8190 MLL=VAL("&H"+MID$(ML$,3,2)+MID$(ML$,1,2))  '  Get byte count of ML string
8200 MLS=VAL("&H"+MID$(ML$,7,2)+MID$(ML$,5,2))  '  Get start addr of ML string
8210 IF MLL=0 THEN GOTO 8280  '  Zero byte count ends ML data
8220 FOR I=0 TO MLL-1
8230    POKE FNCODE!(MLS+I),VAL("&H"+MID$(ML$,9+I*2,2))  '  Put ML data in array
8240    NEXT I
8250 MLLINE=MLLINE+10  '  Keep track of DATA line number, in case of error
8260 GOTO 8130
8270 REM  Set up CALL address pointers - offsets are at beginning of array
8280 WPEEK=CODEARRAY(0): WPEEK!=0  '  Two-byte peek
8290 WPOKE=CODEARRAY(1): WPOKE!=0  '  Two-byte poke
8300 LPEEK=CODEARRAY(2): LPEEK!=0  '  Four-byte peek
8310 LPOKE=CODEARRAY(3): LPOKE!=0  '  Four-byte poke
8320 IOWRITE=CODEARRAY(4): IOWRITE!=0  '  Synchronous Write ROM call
8330 IOWRITEASYNC=CODEARRAY(5): IOWRITEASYNC!=0  '  Asynchronous Write ROM call
8340 RETURN
8350 REM
9000 REM  This is the music to be played
9010 REM
9020 REM    First data item is tempo, in standard metronome units
9030 REM        (quarter-note beats per minute).
9040 REM    Subsequent data items are quintuplets of duration and four notes:
9050 REM        Duration is single letter
9060 REM            (S[ixteenth], E[igth], Q[uarter], H[alf], or W[hole]).
9070 REM        Note is note letter (C, D, E, F, G, A, or B),
9080 REM            followed by octave digit
9090 REM                (octave 4 starts with Middle C),
9100 REM            optionally followed by # for sharp or % for flat.
9110 REM        Note may be single letter R to indicate rest.
9120 REM    Final data item is single letter X.
9130 REM
9140 DATA 120
9150 REM
9160 DATA H,R,R,R,R
9170 DATA E,R,R,R,R
9180 DATA E,D5,R,R,R
9190 DATA E,D5,R,R,R
9200 DATA E,D5,R,R,R
9210 REM
9220 DATA H,G5,G4,B4,D5
9230 DATA H,D6,G4,B4,D5
9240 REM
9250 DATA E,C6,G4,C5,E5
9260 DATA S,B5,G4,C5,E5
9270 DATA S,A5,G4,C5,E5
9280 DATA H,G6,G4,B4,D5
9290 DATA Q,D6,G4,B4,D5
9300 REM
9310 DATA E,C6,G4,C5,E5
9320 DATA S,B5,G4,C5,E5
9330 DATA S,A5,G4,C5,E5
9340 DATA H,G6,G4,B4,D5
9350 DATA Q,D6,G4,B4,D5
9360 REM
9370 DATA E,C6,A4,C5,E5
9380 DATA S,B5,A4,C5,E5
9390 DATA S,C6,A4,C5,E5
9400 DATA H,A5,F4#,A4,D5
9410 DATA Q,R,R,R,R
9420 REM
9430 DATA X
9440 END
```


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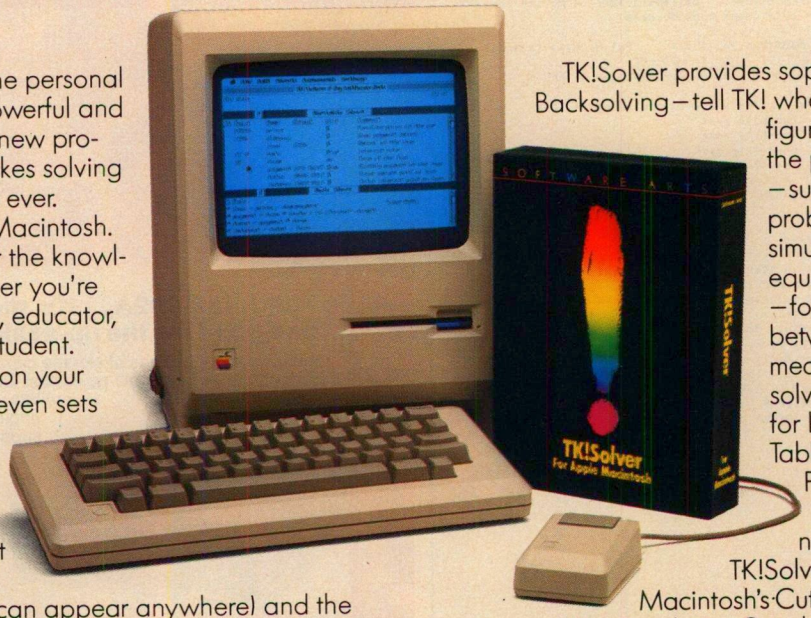


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# Pipeline

*Macintosh and Lisa*

**ProPrint**
ProPrint for the Macintosh is a printer-driver program that outputs text directly to letter-quality printers, making possible the preparation of professional-quality letters, reports, and documents. ProPrint uses pull-down menus and is compatible with Macintosh word-processing programs. It is available with or without a printer cable. *(List Price: With printer cable, $99; without cable, $74)*
Creighton Development, Inc.
4931 Birch Street
Newport Beach, CA 92660
(714) 476-1973
CIRCLE 900 ON READER SERVICE CARD

**Keystroke Data Base**
Keystroke Data Base for the Lisa functions as an electronic filing cabinet with which you can store, find, update, and print information, designing input forms on the screen and executing commands with the mouse. The program sorts reports in up to four fields with 28 columns. To simplify use, all references to storing and retrieving data are made in English—rather than in computer code—and Keystroke uses everyday business terms throughout. To run the Keystroke system, you need a Lisa with 1 megabyte of RAM memory, a hard-disk drive, and a Lisa Office System or Workshop. *(List Price: $595)*
Brock Software Products, Inc.
P.O. Box 799
Crystal Lake, IL 60014
(815) 459-4210
CIRCLE 901 ON READER SERVICE CARD

**Main Street Filer**
An information-management program for the Macintosh, Main Street Filer uses pull-down menus, dialogue boxes, and mouse commands to perform file-design, record-retrieval, and reporting functions. Menus and help messages on most screens make the program easy to use.

The filing system and report generator can handle up to 65,000 records in each file, with up to 36 fields with a maximum of 40 characters in each record. Program features include a tree-index system; four different indexes for each file; and several print programs including customized reports, labels, envelopes, and card-file cards. *(List Price: $249.95)*
Mainstreet Software
One Harbor Drive, Suite 304
Sausalito, CA 94965
(800) 824-8757
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*Keystroke Data Base stores up to two billion records per file.*

**McPic**
McPic is a picture library of 130 pictures created by professional artists for the Macintosh. Using MacPaint and MacWrite, users can reduce or expand the size of the artwork, combine it with other pictures or picture segments, change the tones and patterns, or add text.

The 130 pictures cover a wide range of categories including artwork for business, home, school, and recreational uses. With McPic you can create special letterheads, personal stationery, invitations, and greeting cards. *(List Price: $49.95)*
Magnum Software
21115 Devonshire Street, Suite 337
Chatsworth, CA 91311
(818) 700-0510
CIRCLE 903 ON READER SERVICE CARD

**MacTote**
A high-quality, lightweight carrying case for the Macintosh and its peripherals, the MacTote incorporates such features as an adjustable, non-slip shoulder strap, a padded velcro handle (no snaps), and a side handle for added stability. The interior of the MacTote is lined with antistatic fabric and has padded pouches for the mouse, the disk drive, and the keyboard. On the exterior, there are two zippered pouches for disks on both sides of the case, an open pouch for manuals or notes, and an additional pouch for cords, a modem, or other accessories. MacTote measures 15½ × 12 × 15 inches and weighs less than two pounds. *(List Price: $99.95)*
Optimum Computer Luggage
4445 Fiftieth Street
San Diego, CA 92115
(800) 447-0330; in CA (800) 632-4200
CIRCLE 904 ON READER SERVICE CARD

**Sargon III**
Sargon III, a chess program for microcomputers, is now available for the Macintosh. Using a series of pull-down menus, players can easily maneuver through the game. With the mouse, players can select options and playing levels or move chess pieces

# UCSD PASCAL GOES MAC

And that's great news! Now you can write applications on your Apple™ Macintosh™ in the language programmers love: UCSD Pascal® The original, fully developed industry standard, now runs on the Mac. Complete with extensions for system development and commercial applications programming. It even includes extensions to interface with a set of popular Macintosh features.

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16875 W. Bernardo Drive
San Diego, CA 92127

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16875 W. Bernardo Drive
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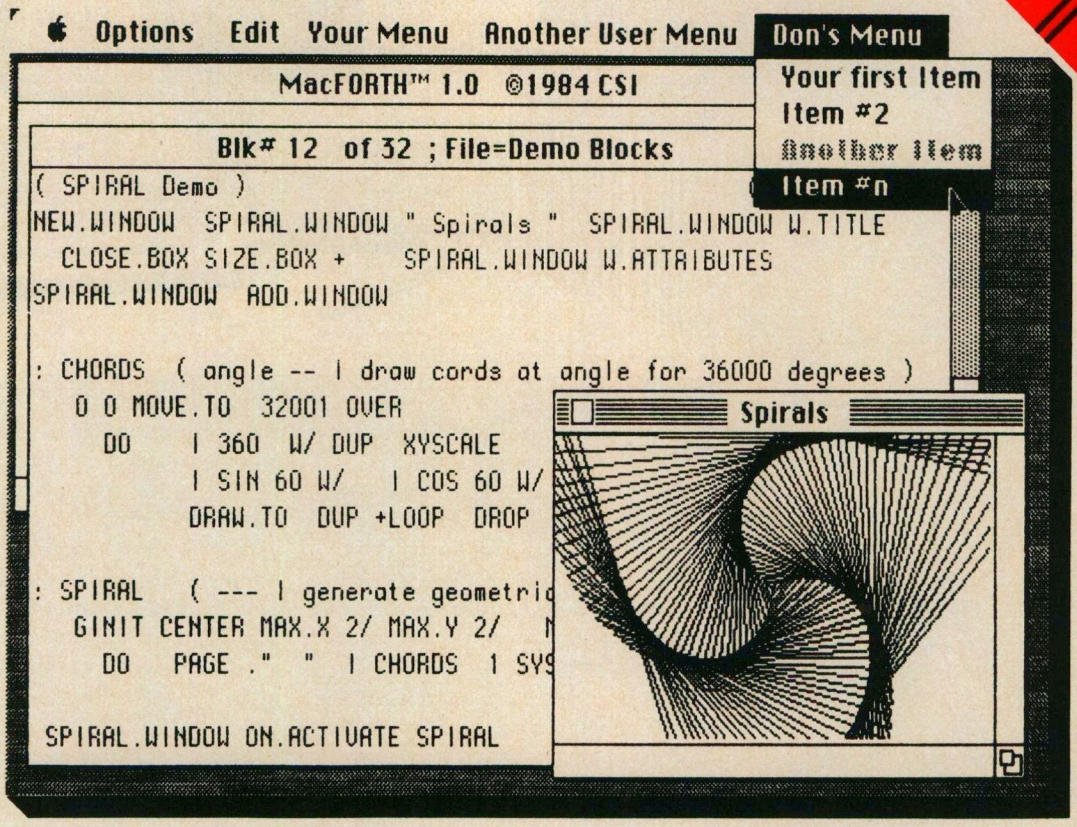


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around the board.

In addition, Sargon III enables you to change the board size, change the colors of the squares, save the game in progress, or print it out in high-quality Macintosh graphics. *(List Price: $49.95)*

Hayden Software Company
600 Suffolk Street
Lowell, MA 01853
(617) 937-0200

CIRCLE 905 ON READER SERVICE CARD

### 1stBASE

A relational-database system for the Macintosh, 1stBASE offers multiple-file capability, user-defined file formats, automatic generation of data-entry screens, use of all Macintosh editing features, and nested sorts of up to ten keys. You can use lstBASE to create personnel files, prospect lists, columnar reports, mailing labels, and other applications. *(List Price: $195)*

Desktop Software Corporation
228 Alexander Street
Princeton, NJ 08540
(609) 924-7111

CIRCLE 906 ON READER SERVICE CARD

### MegaMerge

A mail-merging program for the Macintosh, MegaMerge turns MacWrite into a powerful home and business word-processing system. Using MegaMerge, you can produce form letters and mailing lists and merge large blocks of text into your documents. MegaMerge can also be used in conjunction with MegaFiler, MegaForm, and MegaDesk.

MegaFiler is a simple file-management system that you can use to design your own forms, find a form based on any criteria, sort any field, and print reports. The form size is limited to what is visible on the screen, but an unlimited number of windows give you immediate access to other forms.

MegaForm allows you to design a form that is an exact replica of almost any document. You can then enter information directly into the form and specify mathematical relationships among the sections containing this information. A MegaForm report or form can also accept information from files created with MegaFiler.

MegaDesk consists of three desktop-accessory programs—a calendar, a card file, and reference cards. The calendar allows you to find MegaFiler forms that have been referenced by date and to enter appointment information onto them. The card file allows you to quickly survey MegaFiler files that are on a disk, and the reference-card program provides a basic list database. *(List Price: MegaMerge, $125; MegaFiler, $195; MegaForm or MegaDesk, less than $195)*

Megahaus Corporation
5703 Oberlin Drive
San Diego, CA 92121
(619) 450-1230

CIRCLE 907 ON READER SERVICE CARD

*Mac BarCode, from Computer Identics*

### Mac BarCode

With this program, Macintosh users can generate bar-code labels that meet the requirements of the automotive, health-care, and food-processing and packaging industries, as well as those of the U.S. Department of Defense's LOGMARS programs.

Mac BarCode makes use of the Macintosh's mouse, icons, and pull-down menus. Users enter bar-code data through the keyboard or through networking. *(List Price: $395)*

Computer Identics Corporation
5 Shawmut Road
Canton, MA 02021
(617) 821-0830

CIRCLE 908 ON READER SERVICE CARD

### Desktop Calendar

A combination notepad and appointment book for the Lisa 2, Desktop Calendar integrates your daily schedules and important events with the Lisa Office System. You designate which notes you want to be reminded of later, and Desktop Calendar interrupts you with a reminder at the proper time, even if you are using another program. *(List Price: $295)*

Videx, Inc.
1105 N.E. Circle Blvd.
Corvallis, OR 97330
(503) 758-0521

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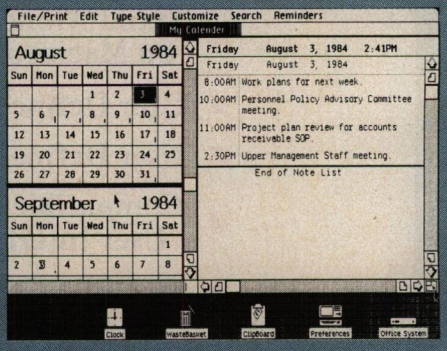


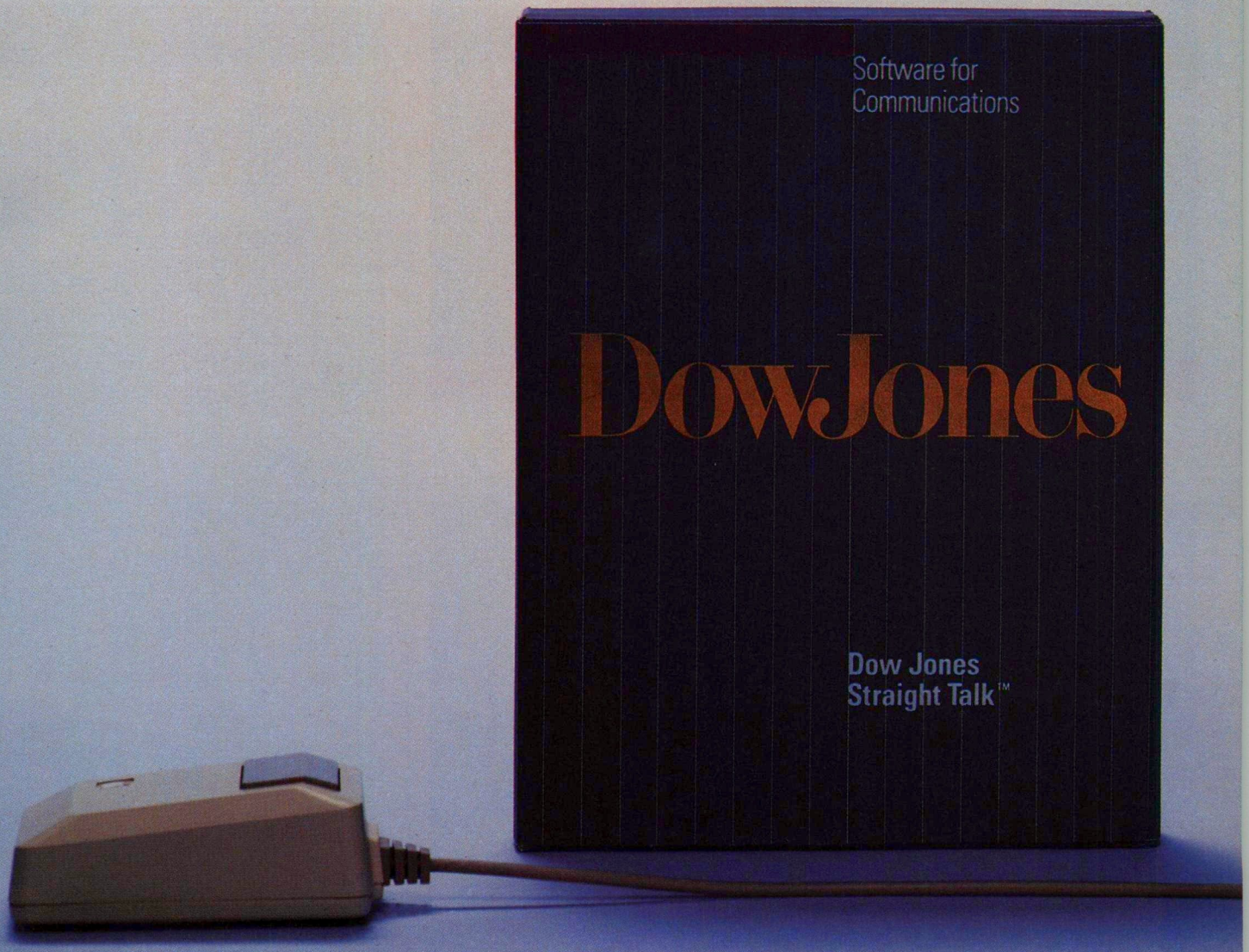

*Desktop Calendar, from Videx*

### Lock-It-Up

This disk copy-protection system for the Macintosh is menu-driven and gives several levels of security that render standard disks virtually uncopyable by even the most sophisticated pirating methods, including advanced nibble-copy programs.

The system, which Double-Gold Software leases to users, includes a software-duplication system that al-

# Now there's smart software™ for the Macintosh.

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CIRCLE 225 ON READER SERVICE CARD

# Get an "A" on your Term Paper.

It's one o'clock in the morning. Your paper on the American Revolution is due at 8 a.m. Where was the misnamed Battle of Bunker Hill *really* fought? It could be the difference between an "A" and a "B".

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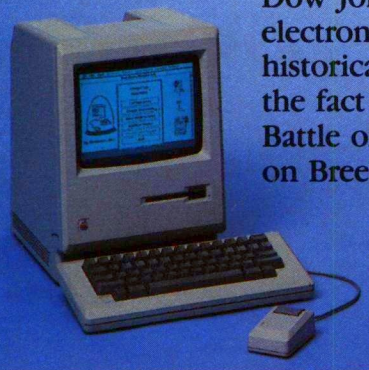
With Straight Talk, the smart software from Dow Jones, you can use an electronic encyclopedia to find the historical fact you need. Even if it's the fact that on June 17, 1776 the Battle of Bunker Hill was fought on Breed's Hill.



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In half an hour, your boss is due to finalize a merger with a company you have doubts about. His career rides on this deal. How can you change his mind before it's too late?

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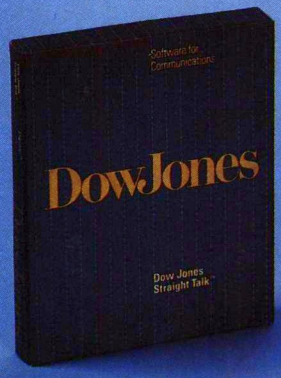


**Dow Jones Straight Talk™**


# Pipeline

lows protected disks to be duplicated rapidly for commercial production purposes. *(List Price: $495, licensing only)*
Double-Gold Software, Inc.
3900 Moorpark Avenue, Suite 29
San Jose, CA 95117
(408) 554-9133

CIRCLE 910 ON READER SERVICE CARD

**Paint Mover**

Paint Mover is a utility that allows you to convert a MacPaint file into a data file compatible with Microsoft BASIC. The converted file can be loaded directly into an array through BASIC programming and displayed on the screen with the Put command.

With Paint Mover, beginning and experienced programmers alike can use MacPaint to create detailed objects for use in games and other application programs, sophisticated menus, or forms. *(List Price: $29.95)*
MacinSoft
Box 27583
San Diego, CA 92128
(619) 745-6084

CIRCLE 911 ON READER SERVICE CARD

**Macintosh Software Diskette**

The Macintosh Software Diskette cleans the Macintosh's disk-drive heads, thus helping to prevent errors or data loss due to smoke, dirt, and oxide buildup on the heads. The program guides you through the head-cleaning process with simple instructions that appear on the computer screen. The 3½-inch cleaning diskettes are disposable, and the diskette jacket is reusable.

The Macintosh Software Diskette comes packaged as part of the Nortronics Diskette Head Cleaning Kit. The kit includes—in addition to the software—two cleaning diskettes, a reusable diskette jacket, and head-cleaning spray. *(List Price: Nortronics Head Cleaning Kit, $39.95; The Macintosh Software Diskette, $29.95)*
Nortronics Company, Inc.
8101 Tenth Avenue North
Minneapolis, MN 55427
(612) 540-8674

CIRCLE 912 ON READER SERVICE CARD

**Filevision**
With Filevision—a combination filing system and object-oriented drawing system for the Macintosh—you can call up information about an object on the screen by pointing at it with the mouse. For closer study, you can select groups of objects that share common characteristics. You can also select information to appear in reports or drawings to print with certain items highlighted. The ready-made pallette contains 20 symbols, and additional symbols can be created. *(List Price: $195)*
Telos Software Products
3420 Ocean Park Blvd.
Santa Monica, CA 90405
(213) 450-2424

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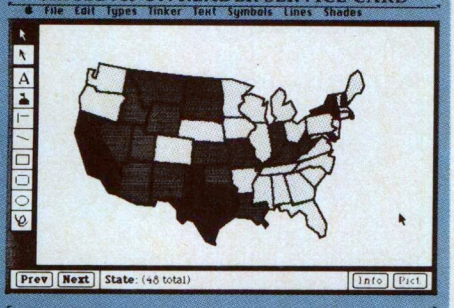


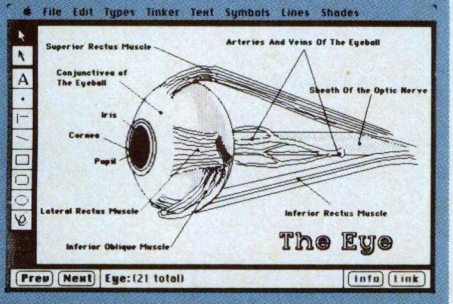


*Filevision, from Telos Software*

**MacManager**
A realistic, competitive management-simulation program for the Macintosh, MacManager gives you complete management control of a hypothetical company. By making business decisions based on financial data, players try to maximize the profits earned by their company. *(List Price: $49.95)*
Harvard Associates, Inc.
260 Beacon Street
Somerville, MA 02143
(617) 492-0660

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The stock market's about to close. That stock you bought has leveled off, and price patterns indicate that the bottom could drop out at any time. You should act before trading ends today.

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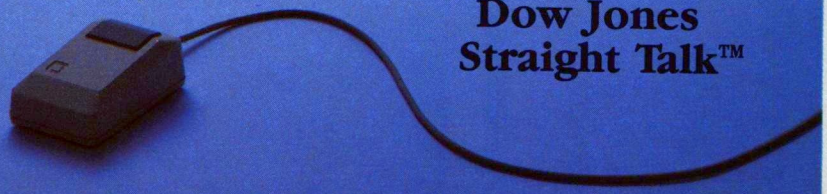
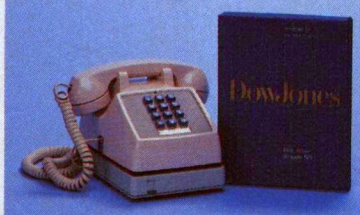


**Dow Jones Straight Talk™**

# Be Smart. See Straight Talk at your Macintosh dealer or call: 1-800-257-5114 for further information.

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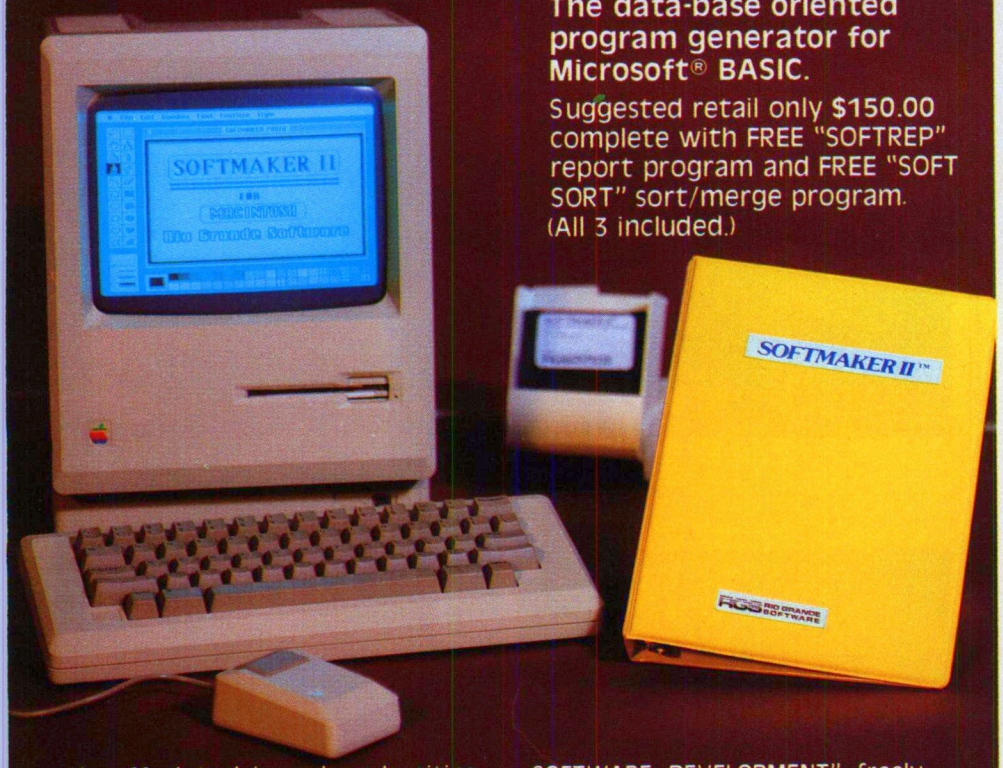


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# Pipeline

**PFS:File and PFS:Report**
Completely redesigned, PFS:File and PFS:Report now work with the Macintosh and its mouse, pull-down menus, and cut-and-paste procedures. Users of these information-management programs can reduce data-entry time by using the Macintosh's clipboard to store and recall commonly used phrases, and they can save PFS data in ASCII format to send via modem.

PFS:File allows users to store, find, sort, and print large amounts of information—including mailing labels—and use PFS:Report to produce presentation-quality reports, table totals, averages, and column counts. You can store up to 2900 records per diskette using PFS:File on the Macintosh and up to 32,000 records on a hard disk. *(List Price: $125 each)*
Software Publishing Corporation
1901 Landings Drive
Mountain View, CA 94043
(415) 962-8910
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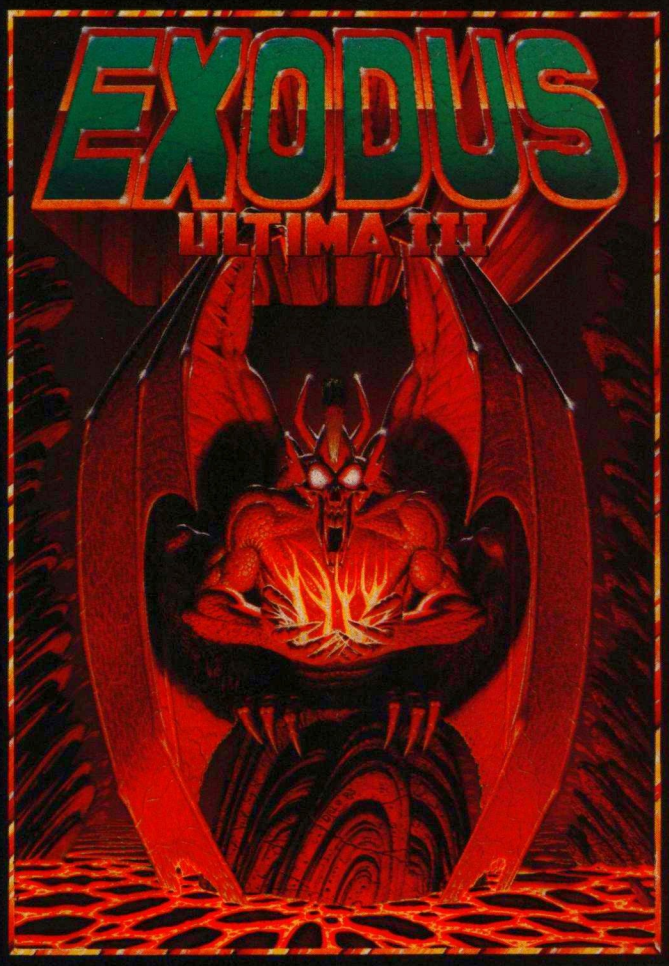
**Softmaker II for the Macintosh**
New from Rio Grande Software, Softmaker II, a database-oriented program generator for Microsoft BASIC, provides a program generator, Softrep report program, and Softsort sort/merge program. With Softmaker II, programs are error-resistant, well designed, and faster to produce. *(List Price: $150)*
Rio Grande Software, Inc.
1107 Upas
McAllen, TX 78501
(512) 630-6979
CIRCLE 924 ON READER SERVICE CARD

**MacModem**
MacModem is a communications package for the Macintosh that includes a 1200 bps modem, communications software, cables, and a subscription to the Dow Jones News/Retrieval Service with one free hour of use.

The Bell 212A-compatible, direct-connect modem offers auto-dial and auto-answer capability, tone and

# *"A LIVING TAPESTRY . . ."*

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*"Exodus: Ultima III, with a superior plot to match its superior gaming system, is a great game. It upgrades the market; in several ways it sets new standards for fantasy gaming state of the art."* — Softline

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***"Do you mean to tell me that I don't have to print out my own image catalog?"***

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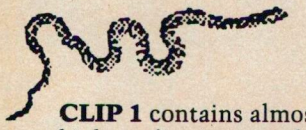

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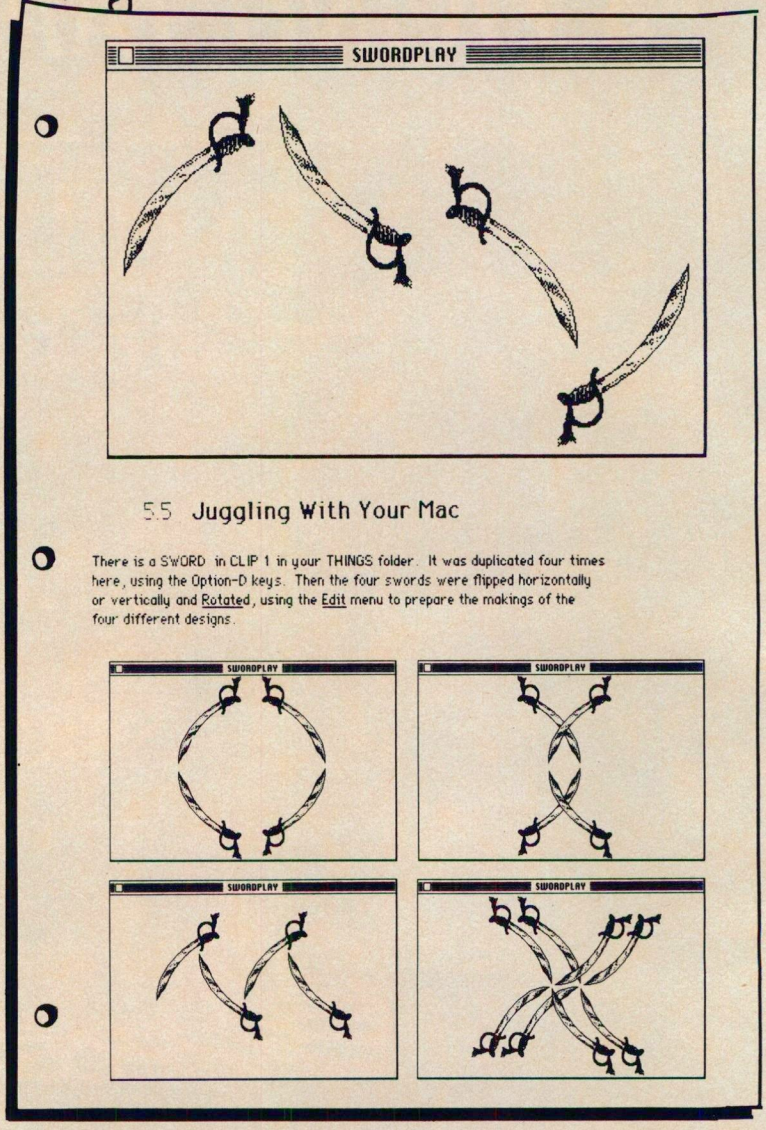


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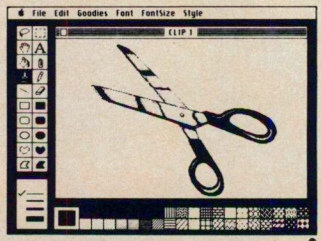


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The MACnificent Software Company"
P.O. Box 3019, Santa Cruz, CA 95063
(408) 476-2358

CLIP ART FOR THE MAC **CLIP 1**®

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with

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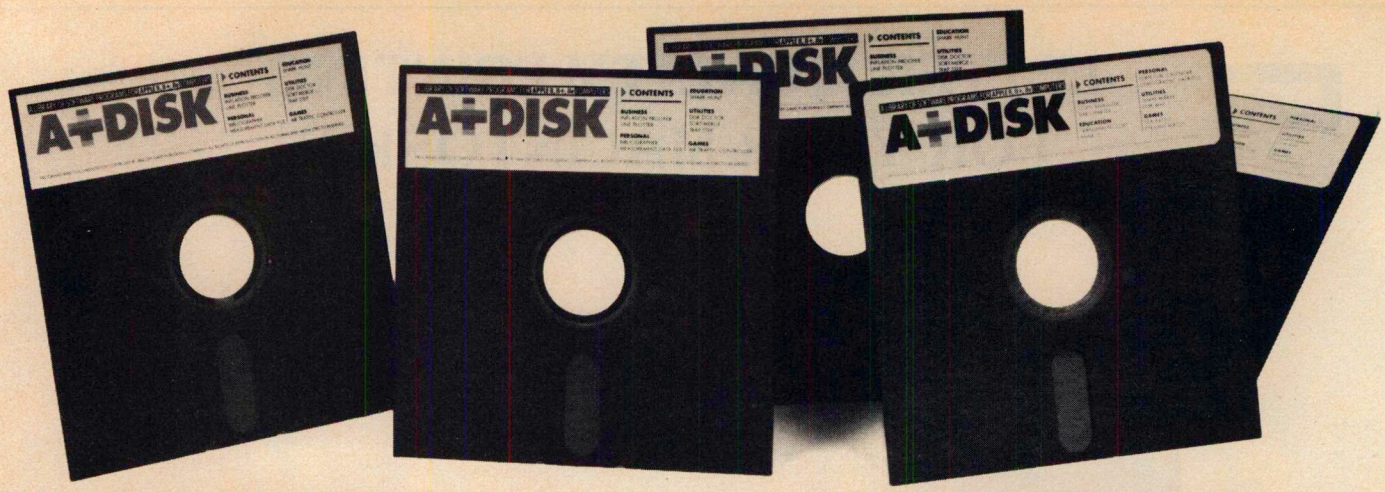


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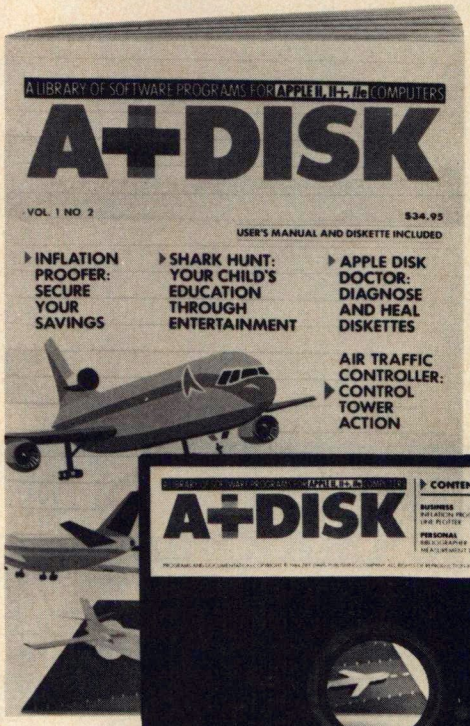


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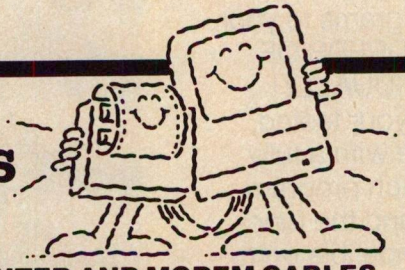

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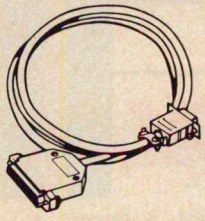

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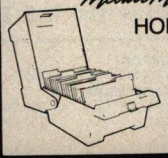

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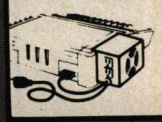

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**Although Gatsby is no longer with us, bonds are—and they're still considered a good investment for long-term income growth.**

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Because bonds pay interest on a specified capital amount (a 12%, $1000 bond pays $120 per year in interest, plus the par value back at maturity), their value has to change to keep the bond in sync with changes in interest rates. Take our 12% example. If interest rates went up, then the value of the bond would have to drop to make the $120-a-year interest payments competitive. Conversely, if interest rates fell, the value of the bond would go up.

For many of you, this little lesson has been a simple refresher in bond basics. Now, get ready to enter the jungle, and

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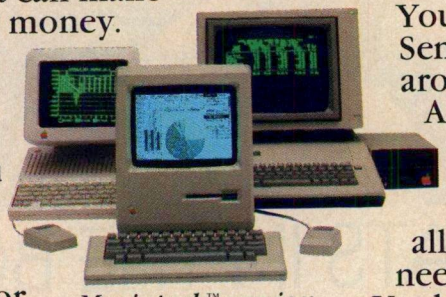

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beware of the TIGRS and CATS.

**The Jungle**

TIGRs (Treasury Investment Growth Receipts), which come from Merrill Lynch, and CATS (Certificates of Accrual on Treasury Securities) from Salomon Brothers are bonds, but not the domesticated type you are used to dealing with. For the calendar year that ended March 31, 1984, conventional 30-year government bonds fell in price 3%, but bonds such as TIGRs and CATS fell 25%.

The generic name for TIGRS and CATS is zero coupon bonds (zeros). Unlike conventional bonds, zeros do not pay interest; instead, they are heavily discounted. If the prevailing market interest rate is 12% and a ten-year zero is "priced to market" or yields 12%, it will cost approximately $312, whereas a conventional ten-year, 12% bond that has a semiannual interest payment will cost approximately $1000.

**With a zero coupon, you don't see a penny of interest until the bond matures, so you don't have the option of reinvesting.**

Why? Because the interest you would receive from the zero coupon bond (if it were a conventional bond) is subtracted from the bond's par value to arrive at its price.

Just like other bond buyers, zero-coupon buyers assume that interest rates won't go up, but down. Thus, they try to lock in today's high rates and know that if inflation falls, their bonds will be worth more.

The zero-coupon feature drastically lowers the price of bonds and makes them attractive to people who might not otherwise buy bonds. With all this going for them, why are zeros financial dynamite? The problem lies in the interest income from the bond.

Remember, a 30-year government bond pays interest semiannually, but a zero coupon bond does not pay interest until maturity. If rates do go up, you can mitigate the effect by investing the interest you receive from a conventional bond into another instrument (other bonds, money-market funds, and so on) that are yielding the new, higher rate. With a zero coupon, you don't see a penny of interest until the bond ma-

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tures, so you don't have the option of reinvesting. You're locked in to the same interest rate, which could go well below future market rates, for the life of the bond.

As we have already learned, if interest rates go up, the value of the bond goes down, and in the case of zeros, it goes way down! Of course, your losses are only on paper, unless you sell the bond. According to Pacific Investment Management of Newport Beach, California, a 10-year zero is nearly twice as volatile in price as a 10-year conventional bond, a 20-year zero is nearly three times as volatile, and a 30-year zero is about four times as volatile as a 30-year conventional bond.

Even with this high degree of volatility, zeros can be a good investment, especially for self-directed Individual Retirement Accounts (IRAs) or in custodial accounts (such as a child's education fund). The advantage of a zero coupon bond is that you automatically earn interest on your interest at a set rate, even if interest rates fall. For example, on a 20-year 12% zero coupon bond, one-quarter of the total interest is on the initial cash investment, and three-quarters is interest on interest. That's what makes these bonds so attractive for retirement. In a market where the prevailing interest rate is approximately 12.45%, a 30-year zero coupon bond costs approximately $300. Twenty years later you'll get $1000.

**Tax Considerations**

For our analysis, we will look at zeros as IRA investments, so we can ignore the effects of income tax. If you "break" the IRA, however, or are evaluating bonds as a standard investment, be advised—with conventional bonds, the bondholder has to pay tax on received income (interest payments). With a zero coupon bond, the bondholder pays taxes on the theoretical interest accretion.

**A Spreadsheet Model**

Now that you have a basic understanding of what goes on with zeros, we are going to build a spreadsheet model that analyzes how an investment in zeros can help or hurt you (see figure 1). In no way does our analysis presuppose that zeros are a bad investment. On the contrary, for investors who will hold them for the long term, they lock in interest rates that are historically high. You can use any spreadsheet program you want for this model, because it uses common commands.

The value of a conventional bond is the sum of the present value of the interest paid each year plus the present value of the par, or maturity, value, which is typically $1000 per bond. The present value of a zero is based only on the par value of the bond. Remember, there is no periodic interest payment, only full settlement at maturity.

Let's look at the formulas in the spreadsheet and see what we are doing. Luckily, we can use standard formulas for computing the present value of each dollar we will get in the future (the par value of the bond) and the present value

```
B10: (C0) +$D$1-(($D$1/$B$20)*
((($D$1*$D$4)/2)*(1-(1/((1+(B9/2))^($D$2*2))))/(B9/2)+
($D$1*(1/((1+(B9/2))^($D$2*2))))))-(($D$1/$E$20)*
$E$20-(($D$1*(1/((1+(B9/2))^($D$2*2)))))))
```

*Figure 1: This spreadsheet formula analyzes how an investment in zero coupon bonds can help or hurt you. Note: $ = a constant formula (reference), whereas no $ means the reference changes when replicated.*


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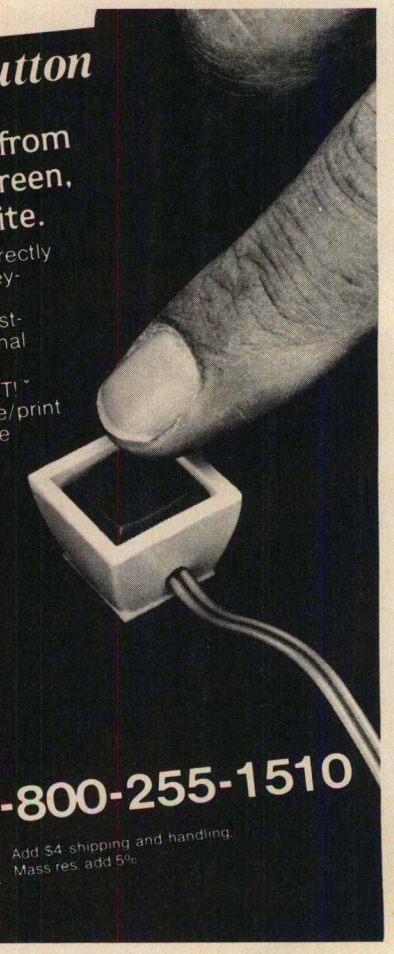

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of each dollar of the interest income, which is also called an annuity.

The formula for each calculation is basically the same. The only variable that changes is the interest rate. The areas shaded yellow in the formula are for computing the present value of the bond's par value. We compute a factor, which tells us what each dollar is worth, and then multiply it by our investment, which gives us the total present value of the par value of the bond.

The areas shaded pink compute the present value of the interest annuity on a conventional bond. Notice that we divide the interest rate and the coupon payment in two because of the semiannual interest payment, which, with bonds, has a higher value than does a yearly payment.

The blue area is a "leveler." Because we are using the theoretical market price for the bonds, we have to calculate how many bonds we can afford for our investment. By dividing our investment by the theoretical market price, we come up with a decimal factor that "levels" our calculations to our investment amount.

The green area is also a leveler. Because zeros are drastically different in price from conventional bonds, we have to develop an equivalent means of comparing them—an apples-to-apples, rather than apples-to-oranges, comparison. To do so, we divide the theoretical price of a zero coupon bond into the total investment and multiply our valuation calculations by it.

At the bottom of the spreadsheet, we compute the estimated present value of a conventional bond, as well as a zero coupon bond. We use these calculations to compute the change in price of both bonds as the interest rate increases. (Figure 2 shows how the spreadsheet will look on your computer.)

**Risk or Reward?**

The risk analysis calculates the additional loss you may sustain with a zero coupon bond compared to a similarly priced conventional bond if interest rates go up. At each interest rate, we take the original investment in each type of bond and subtract it from the bond's "new" price (the new price is based on the interest rate shown in figure 2 above the estimated loss). The formula then multiplies the difference by the respective levelers to get the equivalent loss on each bond.

Finally the formula subtracts the change in price of the zero coupon bond from the change in price of the conventional bond. The result is the additional loss that you would incur on a zero coupon bond over a conventional bond as rates rise.

To build the spreadsheet, set up your headings to correspond to the row-and-column references in figure 2. Key the formula in figure 1 into cell B10, making sure that you keep the relative vs. the constant references the same. Then use your spreadsheet's Copy or Replicate commands to copy the formula B10 into cells C10–F10, B13–F13, and B16–F16. Finally, key the formula in figure 3 into cell B20 and the formula in figure 4 into cell E20.

**The bond market, just like the stock, currency, and commodity markets, is an auction market.**

To use the spreadsheet, all you have to do is enter the necessary information—the investment, the number of years until the bond matures, the prevailing interest rate (prime or T-bill rate) at the time of the offering, and the coupon rate of the bonds—in the input section (the first four lines of the spreadsheet entry), making sure that the numbers go into cells D1–D4. The model will do the rest.

The risk analysis shows you what your additional loss will be at .25% intervals, all the way up to 4% above the prevailing market rate. By changing the interest and coupon assumptions, you can see the sensitivity of the bond.

If you have bought some zeros, you can plug in the prevailing interest rate and coupon rate that were in effect when you bought them and look at what's happened to them. Remember to adjust the years to maturity. A seven-year bond you bought one year ago has only six years left to maturity.

The closer the bonds get to maturity, the less the difference in their pricing, thus less additional loss. Try it on the spreadsheet, and you'll see the prices gradually merge together.

As with any analysis, we have made some simplifying assumptions. In this case, we have ignored brokerage commissions and taxes and have based the analysis on theoretical prices, rather than on historical market changes.

The bond market, just like the stock, currency, and commodity markets, is an auction market. As anyone who has ever been to an auction can tell you, emotion plays a big part in determining prices. It is this emotion that we have not quantified in our formulas, which is why the prices are "theoretical." We could probably incorporate emotion, but it would make the formulas, and thus the spreadsheet, more complex and difficult to use.

Build the spreadsheet on your Apple and give it a try. Knowing how much you may lose is a lot better than losing money you can't afford to lose. +

| | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 1 | INVESTMENT | | | $1,000 | | |
| 2 | YEARS TO MATURITY | | | 10 | | |
| 3 | INTEREST RATE AT TIME OF OFFERING | | | 11.50% | | |
| 4 | COUPON RATE ON BONDS AT OFFERING | | | 12.25% | | |
| 5 | ********** | | | | | |
| 6 | RISK ANALYSIS- ESTIMATED LOSS ON ZEROS VS. CONVENTIONAL BONDS | | | | | |
| 7 | IF INTEREST RATES RISE | | | | | |
| 8 | | | | | | |
| 9 | INT. RATE | 11.75% | 12.00% | 12.25% | 12.50% | 12.75% |
| 10 | EST. LOSS | ($9) | ($18) | ($26) | ($35) | ($42) |
| 11 | | | | | | |
| 12 | INT. RATE | 13.25% | 13.50% | 13.75% | 14.00% | 14.25% |
| 13 | EST. LOSS | ($58) | ($65) | ($72) | ($79) | ($85) |
| 14 | | | | | | |
| 15 | INT. RATE | 14.75% | 15.00% | 15.25% | 15.50% | 15.75% |
| 16 | EST. LOSS | ($98) | ($103) | ($109) | ($115) | ($120) |
| 17 | ********** | | | | | |
| 18 | | | | | | |
| 19 | CONVENTIONAL BOND PRICING | | | | ZERO COUPON PRICING | |
| 20 | | $1,044 | | | $327 | |

*Figure 2: Sample spreadsheet display with zero-coupon analysis*

```
(($D$1*$D$4)/2)*(1-(1/((1+($D$3/2))^($D2*2))))/($D$3/2)+
($D$1*(1/((1+($D$3/2))^($D2*2))))
```

*Figure 3: Formula for determining conventional-bond pricing*

```
$D$1*(1/((1+($D$3/2))^($D2*2)))
```

*Figure 4: This formula gives you zero-coupon pricing.*

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## GAME REVIEWS

### TITAN EMPIRE

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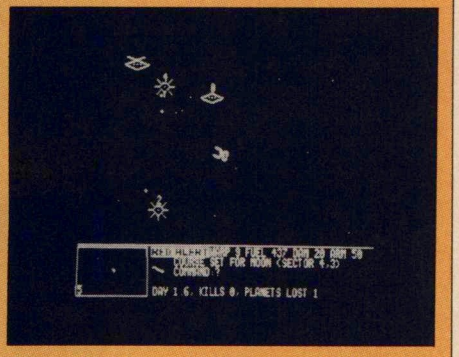
Yet another horde of aliens imperils Earth, and the powers that be call for a daring, intrepid Captain Kirk-like hero to save Terra from the space terrors.




Only this time, the enemy isn't the Klingons, but the evil denizens of Titan, one of Saturn's moons. These infamous invaders want to conquer the solar system, and guess who's been recruited to clash with the Titans?

Titan Empire, a tedious combination arcade and strategy game, places you in command of a starship. Another entry in the "Star Trek-with-the-innovative-twist" competition, this game fails to capture the wonder and excitement of the original game.

Titan Empire actually contains two twists. The first one makes our solar system the field of play, that is, from scorching Mercury to icy Pluto. Players can visualize familiar planets and moons.

The other twist borders on the mundane. Titan Empire places armies at your disposal, supposedly for conquering and defending planets. As any armchair general knows, he who controls the air, which is outer space, controls the ground, that is, the planet. You can annihilate all armies stationed on a planet by placing your starship in orbit and launching a ground bombardment.

As the starship commander, you have a five-year mission to conquer strange Titan worlds, to seek out and destroy Titan life-forms and Titan civilization.

At your disposal is an Earth starship armed with photon torpedoes and tracking missiles, but, alas, no phasers. It does come with shields and an extensive set of sensors. The ship holds 500 units of fuel; and each time you fire the weapons or put up the shields, fuel units are subtracted. The ship is capable of speeds up to warp 9, that is, nine times the speed of light, but not impulse power, which is sublight speed. The faster the speed, the higher the fuel consumption. If destroyed, the ship reincarnates over a friendly planet.

The solar system contains 9 planets and 21 moons. Each planet or moon holds 1023 units of fuel and a maximum of 255 armies. At the start, Earth controls 22 of these heavenly bodies, with the Titans controlling the balance. Your starship begins play orbiting Earth.

**Captain's Commands**

The keyboard commands are swift and responsive and break down into five types: movement, combat, display, pilot, and orbiting. You can move either manually, that is, altering course by pressing one of the four direction keys, or automatically, by specifying a course to a particular planet or moon. You can alter the warp speed at any time, but even at warp 9, traveling between planets is slow and monotonous.

**The programming is competent, but the game design is seriously flawed.**

The firing, display, and pilot commands require only a single keystroke to perform their functions. In general, the program carries out the commands swiftly. Some of the more thoughtful commands include a Help menu, Pause Game, Save Game, and Clear All Previous Commands. The game saves high scores in the Titan Empire Hall of Fame.

Meanwhile, the Titans, those interplanetary nasties, are fanning throughout the solar system, conquering distant planets and moons and trying to overwhelm you with numerical superiority. As they take more planets, however, their offensive spirit lessens and they send out their forces piecemeal. This change of tactics probably occurs because the program compensates for the material imbalance, or perhaps it is because you've vaporized so many of the little buggers.

**Stone-Age Graphics in the 23rd Century**

Titan Empire's graphics are predominantly black and white, presenting an abysmal lack of color and creativity. Two effects, the scrolling purple-and-orange star field in the background and the colorful explosion of a Titan ship, look pretty good. Unfortunately, that's about all the color the game contains.

The game's sound effects, though simple, are more effective than the graphics. The red alert beeps, photon hits register as grating sounds, and if the Titans destroy your starship, the game plays a funeral dirge.

Designer E. Zaron apparently tried to make a more graphics-oriented version—with a couple of twists—of the original Star Trek game. The programming is competent, but the game design is seriously flawed.

Fueling up, repairing damage, and beaming armies up and down create minor delays that may be logical, but are not especially enjoyable. In addition, you experience a sort of rigor mortis as the warp-9 starship plods slowly between planets.

Even when you reach a planet, what difference does it make? Planets and moons are all the same, from an icy rock called Pluto, to a gas giant named Jupiter.

Armies seem to be a good idea at first, but they add an extra element of bookkeeping. Parking the starship in orbit and bombarding the Titan armies with missiles is more effective than beaming down an invasion.

I disagree with Titan Empire's designation as an educational game. I find no lessons in astronomy, physics, or other science.

As for information, the five pages in the booklet contain facts and figures that are easily forgotten and just as easily found in an encyclopedia. The National Aeronautics and Space Administration, through the Government Printing Office, publishes books, booklets, and posters that are far more informative, interesting, colorful, and inexpensive than Muse's Titan Empire.

Titan Empire falls light-years short of educating and entertaining you. Its yawn-provoking graphics and dull play make Titans only half as much fun to destroy as Klingons. If you can measure a game at warp speeds, Titan Empire plods along on impulse power.

*Russ Lockwood*

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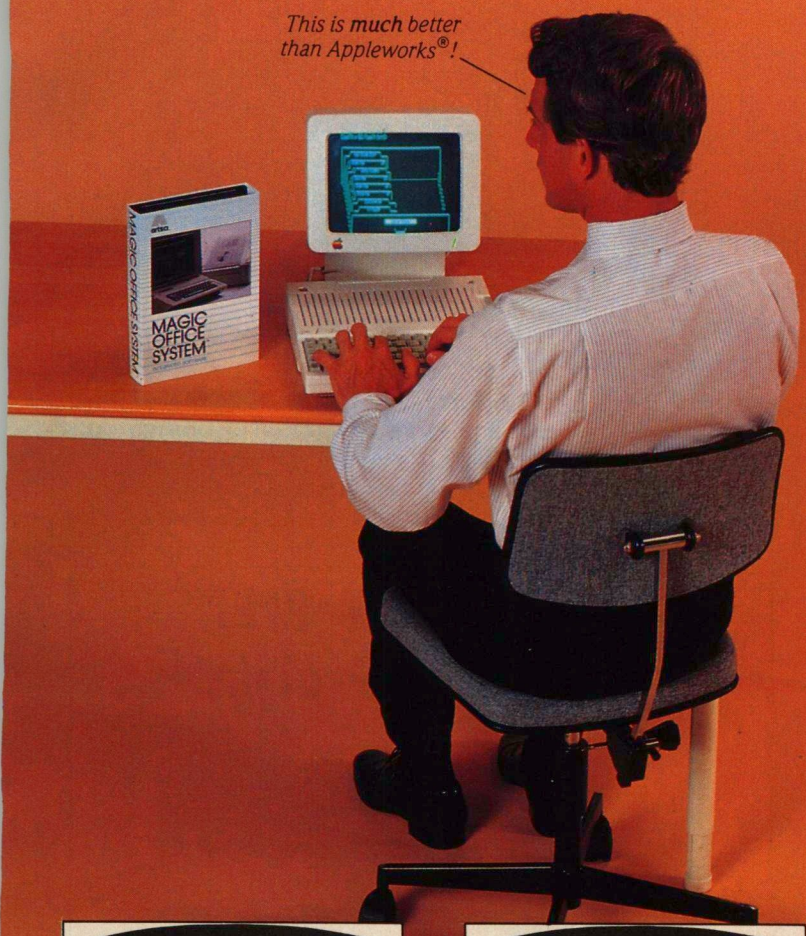


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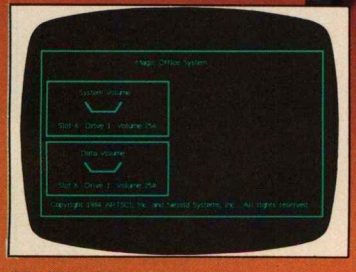

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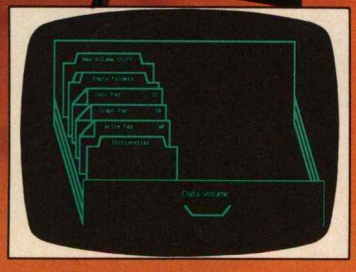

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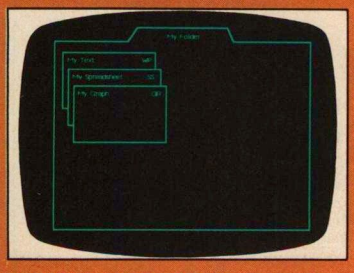
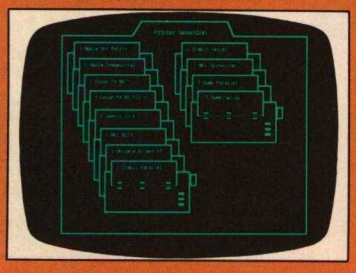


*organize your documents.*



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## JURY TRIAL II

Navic Software
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**Requires:** Apple II, II Plus, or IIe; 48K RAM; one disk drive

CIRCLE 472 ON READER SERVICE CARD

The prosecuting attorney faced the witness on the stand. "Mr. John Onthespot, where were you the night of the 12th, at about 6:00 in the evening?"

"At the corner of 86th and 66th. I was out for a walk."

"And you saw someone exiting from a second-floor apartment through a window."

"Objection, your honor. The attorney is leading the witness," the defense attorney protested.

"Overruled."

"Describe that person."

"Yes. A big man, somewhat young, wearing an orange shirt, open collar, short sleeves. And red pants. He had a tattoo on his arm."

"And is this suspect the man you saw?"

"Yes, that's he."

"Your honor, the prosecution rests!"

**Apple as Courtroom**

Jury Trial II, a fascinating game of legal strategy, packs a courtroom full of suspense into your Apple. The game is for two players—one takes the role of the prosecuting attorney and the other the defense attorney. Additional players serve as witnesses, and the computer functions as judge and jury.

**You must gather clues about the crime, choose a jury, and argue the case in court.**

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First, the police describe the scene of the crime, in this case a break-in at 86th and 66th streets. A paragraph details the time, date, weather, and what was stolen.

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| EMPIRE BLDG. | Pro DOS Operating System | YES-FREE | NO | PATIENT RECALL |
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| STOCK ANALYSIS | Works on APPLE II +, IIe, IIc, III, Franklin | YES | YES | CUSTOMER ACCOUNTS |
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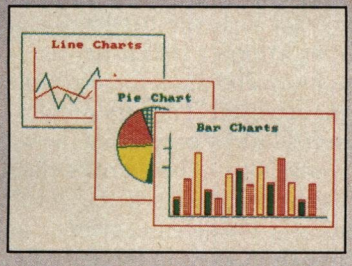


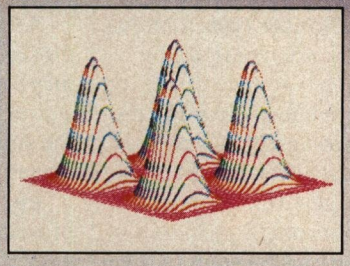

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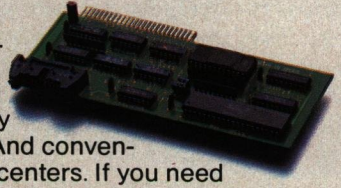

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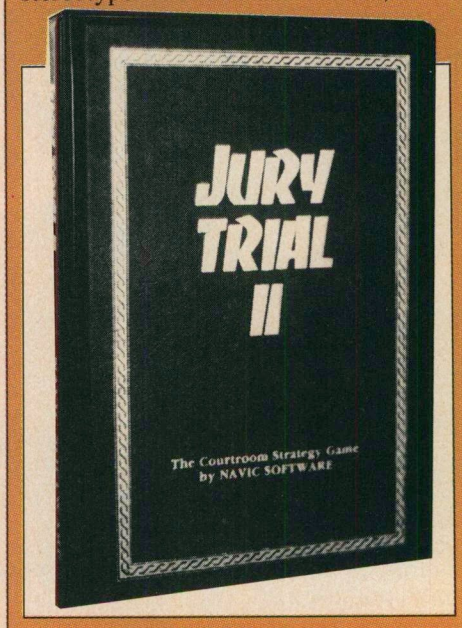
A+ THAT'S ENTERTAINMENT

You need a six-member jury to start the trial. Jury selection is where the attorneys begin to lock horns over the case, and it affects the entire game.

The 12-page instruction booklet describes the jurors, complete with caricatures. All the jurors represent stereotypes of one sort or another, including an Archie Bunker type, a brainless beauty, a stuffy aristocrat, and a real dipstick.




As the prospective jurors parade by, both attorneys must agree on a choice before that candidate is seated. Each attorney can challenge—that is—veto, the seating of two jurors.

Of course, the attorneys want to take advantage of these biases, so they try to stack the jury in their own favor. For example, the prosecution always wants to seat Mr. Hawgg, the Archie Bunker type, because he always votes to convict. On the other hand, the defense wants to seat kindly Ms. Eubank, who usually votes to acquit.

**Questioning**

During the trial, each witness appears for five questions of direct testimony and five questions of cross-examination. The attorneys do not ask their own questions. Instead, the computer displays a question on the screen, and the questioning attorney can choose to ask it or pass it by. The opposing attorney may object to any question, and the computer judge overrules or sustains the objection.

Questions come in three basic types: yes-and-no, one-word descriptions, and affidavits. A yes-and-no question, such as "Was the weapon a type of firearm?" requires a yes or no answer. Other questions, such as "What color was the getaway car?" require one-word answers.

Affidavits pose the toughest and most important questions. They usually ask the witness to describe the crime scene, suspect, or getaway vehicle. The opposing attorney cannot object to an affidavit.

The program is pretty clever at picking out the key words in the affidavit, so you cannot fool it. For example, one scatterbrained witness described the scene of the crime as a "ship at sea, 16th century galleon." The program rejected the affidavit as immaterial to the case.

The program accepts attorneys' and witnesses' input quickly, with new questions appearing almost instantaneously. Affidavits require a few seconds to tabulate but do not slow game play down measurably.

As in real courtroom battles, the prosecuting attorney tries to get the jury to convict, and the defense attorney strives for acquittal. The jury decides the suspect's fate by comparing the witnesses' answers with the sheriff's clues.

Each time a witness, whether for the prosecution or the defense, gives an answer that matches one of the sheriff's clues, the prosecution receives "one point for conviction." Each juror has a certain numerical threshold. If the total number of conviction points exceeds this threshold, the juror votes to convict. If not, the juror votes to acquit.

For example, the prosecution needs very few conviction points to convince Mr. Hawgg to convict the suspect. On the other hand, the prosecution requires many points to convince Ms. Eubank to vote to convict. You can see why jury selection is so important. Thus, witnesses on both sides must pay attention to the clues. The prosecution witnesses try to agree with the clues, and the defense witnesses try to disagree.

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During the trial, the screen displays the questions at the top, the answers underneath, and the jurors' ongoing reactions to the evidence at the bottom. As the prosecution gains and loses conviction points, the jurors change their opinions of the suspect's guilt or innocence.

When the jury returns a verdict, the losing attorney may appeal and try the case over again. If the defendant is guilty and appeal is waived, the judge pronounces a sentence proportional to the number of conviction points. If innocent, the defendant goes free.

Since Jury Trial II is a battle of wits and not fingers, its graphics consist almost entirely of text. The few examples of color are limited to a banging gavel and the opening and closing screens.

Jury Trial II is a silent program, containing few sound effects. A staccato buzzing accompanies descriptions of potential jurors. Another buzz signals the banging of the gavel. Other than that, the game proceeds quickly.

Although Jury Trial II is designed for two or more players, I found the solitaire version as fascinating and challenging as playing the game against an opponent. As both prosecuting attorney and witness, you try to remember all the facts and clues. If you can, you get the conviction. If not, the defendant walks.

**Jury Trial II effectively presents the trials and tribulations of courtroom drama. Whether you play the game alone or with others, Jury Trial II is an appealing brain teaser.**

The game contains some nice touches. It swears in all witnesses by asking if they "promise to tell the truth, the whole truth, and nothing but the truth." Incidentally, should you answer "no," you will be prohibited from giving testimony.

The game can give you a hung jury if the jurors fail to reach a unanimous decision. The judge then declares a mistrial, and you try the case again.

Jury Trial II effectively presents the trials and tribulations of courtroom drama. Whether you play the game alone or with others, Jury Trial II is an appealing brain teaser. The reviewer rests his case.

*Russ Lockwood*

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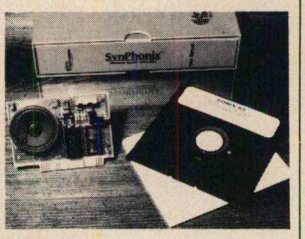

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| Addition Magician | 23.00 |
| Reader Rabbit | 26.00 |
| Magic Spell | 23.00 |
| Juggle's Rainbow | 19.00 |
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| Gertrude's Puzzles | 28.00 |
| Gertrude's Secrets | 28.00 |
| **MECA** | |
| Basic Building Blocks | 50.00 |
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| **MICROLAB** | |
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| The New Step by Step | 74.00 |
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| Songwriter & Picturewriter | 26.00 |
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| **SPINNAKER SOFTWARE** | |
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| Trains | 22.00 |
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| Story Machine | 22.00 |
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| Delta Drawing | 32.00 |
| Kids on Keys | 19.00 |
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| Hey Diddle Diddle | 18.00 |
| In Search of | 26.00 |
| Aerobics | 28.00 |
| Grandma's House | 22.00 |
| Kidwriter | 22.00 |
| **SUNBURST** | |
| The Factory | 32.00 |
| Teasers by Tobbs | 32.00 |
| **TERRAPIN** Logo | 63.00 |
| **XEROX** | |
| Sticky Bear ABC | 25.00 |
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| Appleworks | Call |
| Apple Writer IIe | 160.00 |
| Quick File IIe | 78.00 |
| **ARTSCI** | |
| Magic Calc | 95.00 |
| Magic Window II | 95.00 |
| **ASHTON-TATE** DB II | 290.00 |
| **BLUE BUSH** Speed File | 73.00 |
| **BPI** | |
| General Accounting | 298.00 |
| GL, AR, AP, PR or INVEA | 260.00 |
| **CONTINENTAL** | |
| Home Accountant | 48.00 |
| Tax Advantage | 45.00 |
| FCM/FL | 65.00 |
| G/L, A/R, A/P | 150.00 |
| **DICKENS DATA SYSTEMS** | |
| The Wall Street Plotter | 94.00 |
| The Super Plotter | 53.00 |
| **DOW JONES SOFTWARE** | |
| The Market Analyzer | 225.00 |
| Market Manager | 195.00 |
| **HAYDEN** Pie Writer | 99.00 |
| **HOWARD SOFTWARE SERVICES** | |
| Real Estate Analyzer II | 160.00 |
| **KENSINGTON** | |
| Format II Enhanced | 95.00 |
| **LIVING VIDEO** Think Tank II/IIe | 94.00 |
| **MEGAHAUS** | |
| MegaFinder | 105.00 |
| MegaSpell | 45.00 |
| MegaWriter | 67.00 |
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| Wordstar | Call |
| Calcstar | 280.00 |
| Wordstar W/Z Card | Call |
| Word/Spell/Mail | 540.00 |
| **MICROSOFT** Multiplan | 130.00 |
| **MID WEST SOFTWARE** | |
| Write Away | 115.00 |
| **PEACHTREE** Peach Calc | 92.00 |
| **QUARK** | |
| Lexicheck Word Juggler IIe Combo | 145.00 |
| **SENSIBLE SOFTWARE** | |
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| Bookends | 75.00 |
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| The General Manager II | 145.00 |
| Homeword | 45.00 |
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| The Handlers Package | 105.00 |
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| **SOFTLINK** Practical Accountant | 97.00 |
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| DB Master Version 4 Plus | Call |
| **VISICORP** | |
| Advanced Visicalc IIe | 200.00 |
| Visicalc IIe & II | 164.00 |
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| Millionaire | Call |
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| Coveted Mirror | 20.00 |
| The Quest | 20.00 |
| Main Street Filer | 153.00 |
| Helix | Call |
| Sargon III | 31.00 |
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| Zork I | 24.00 |
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| Imagewriter | 495.00 |
| Daisy Wheel Printer | 1,770.00 |
| **BROTHER** | |
| HR-25 | 745.00 |
| HR-35 | Call |
| **DAISY WRITER** 2000 | Call |
| **DIABLO** | |
| 620 (RS-232C) | 850.00 |
| 630 (PC) | 1,785.00 |
| Ink Jet Printer | 1,150.00 |
| **DYNAX** DX-15 | 435.00 |
| **EPSON** | |
| FX-80 | Call |
| FX-100 | 675.00 |
| RX-80FT | 360.00 |
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| **IDS** | |
| Prism 80 (Basic) | 1,065.00 |
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| P 480 Micro Prism | Call |
| **JUKI** 6100 | 445.00 |
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| MT-160L | 605.00 |
| MT-180L | 795.00 |
| MT-Spirit | 295.00 |
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| KXP 1090 | 285.00 |
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| 8510AP | Call |
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| 8510SP | 465.00 |
| Starwriter A10-20P | 490.00 |
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| **SILVER REED** | |
| 500P | 415.00 |
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| **STAR MICRONICS** | |
| Gemini 10X | Call |
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| Radix 15 (200 CPS) | 720.00 |
| Power Type | 355.00 |
| Delta 10 | 395.00 |
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| **TOSHIBA** Printers | Call |
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| 130P | 550.00 |
| 315 | 455.00 |
| Pics Card | 95.00 |

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| Disk II Drive | 300.00 |
| Duo Disk w/acc. kit | Call |
| Pro File Disk Drive | Call |
| IIc Add-On | Call |
| Mac Add-On | Call |
| **INFAX** | |
| 101 10 Meg | 2,145.00 |
| 102 20 Meg | 3,350.00 |
| Cartridges | 60.00 |
| **INDUS** GT Slimline | 250.00 |
| **MICRO SCI** | |
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| **QUENTIN** | |
| AP 100A Full Height | 215.00 |
| AP 105 Slimline | Call |
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| Color I Plus | 275.00 |
| Color II S | Call |
| Video 300G Green | 135.00 |
| Video 300A Amber | 147.00 |
| DVM II or DVM III RGB Interface | 130.00 |
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| Color Plus | Call |
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| DTD 1300 RGB | Call |
| **SAKATA** | |
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| 410-64 RGB-2 Interface | 240.00 |
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| Double Take | 23.00 |
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| Bank Street Speller | 46.99 |
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| The Accountant | 63.00 |
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| Orca/M | 75.00 |
| Compiler Plus (Hayden) | 43.00 |
| **LAZERWARE** Lisa V 2.6 | 58.00 |
| **MECA** Managing Your Money | 130.00 |
| **MICROSOFT** | |
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| Typing Tutor III | Call |
| **MONOGRAM** Dollars & Sense | 68.00 |
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| New Complete Graphics System | 50.00 |
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| Merlin Pro | 46.00 |
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| **SOFTRONICS** Softerm II | 134.00 |
| **TURNING POINT** Time is Money | 64.00 |
| **UNITED SOFTWARE OF AMERICA** | |
| ASCII Pro | 82.00 |
| **VIRTUAL COMBINATICS** | |
| Micro Cookbook II/IIe | 26.00 |

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| **DIGITAL RESEARCH** | |
| CPM Gold Card | Call |
| **HAYES** Joysticks | Call |
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| Micromodem IIe/w Smart Com I | 235.00 |
| 1200 Baud Modem | 498.00 |
| **KENSINGTON** System Saver | 65.00 |
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| **KOALA** | |
| Koala Pad | Call |
| The Gibson Light Pen | 175.00 |
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| Ram Card | 68.00 |
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| Super MX Interface Card | 155.00 |
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| Select A Port | 28.00 |
| Joystick | 30.00 |
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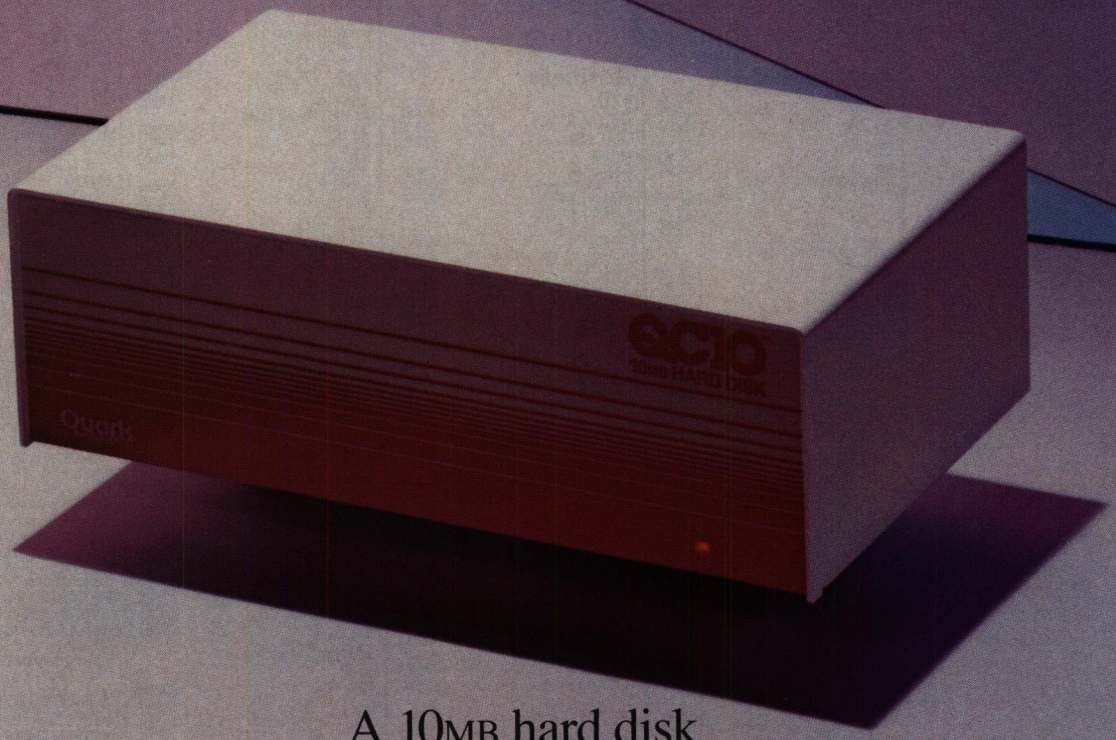


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*If you do not have a Duodisk, or use an Apple III, a special cable is available. See your dealer for details.

**Catalyst works on the Apple IIc, IIe and Apple III. It is not compatible with Macintosh.

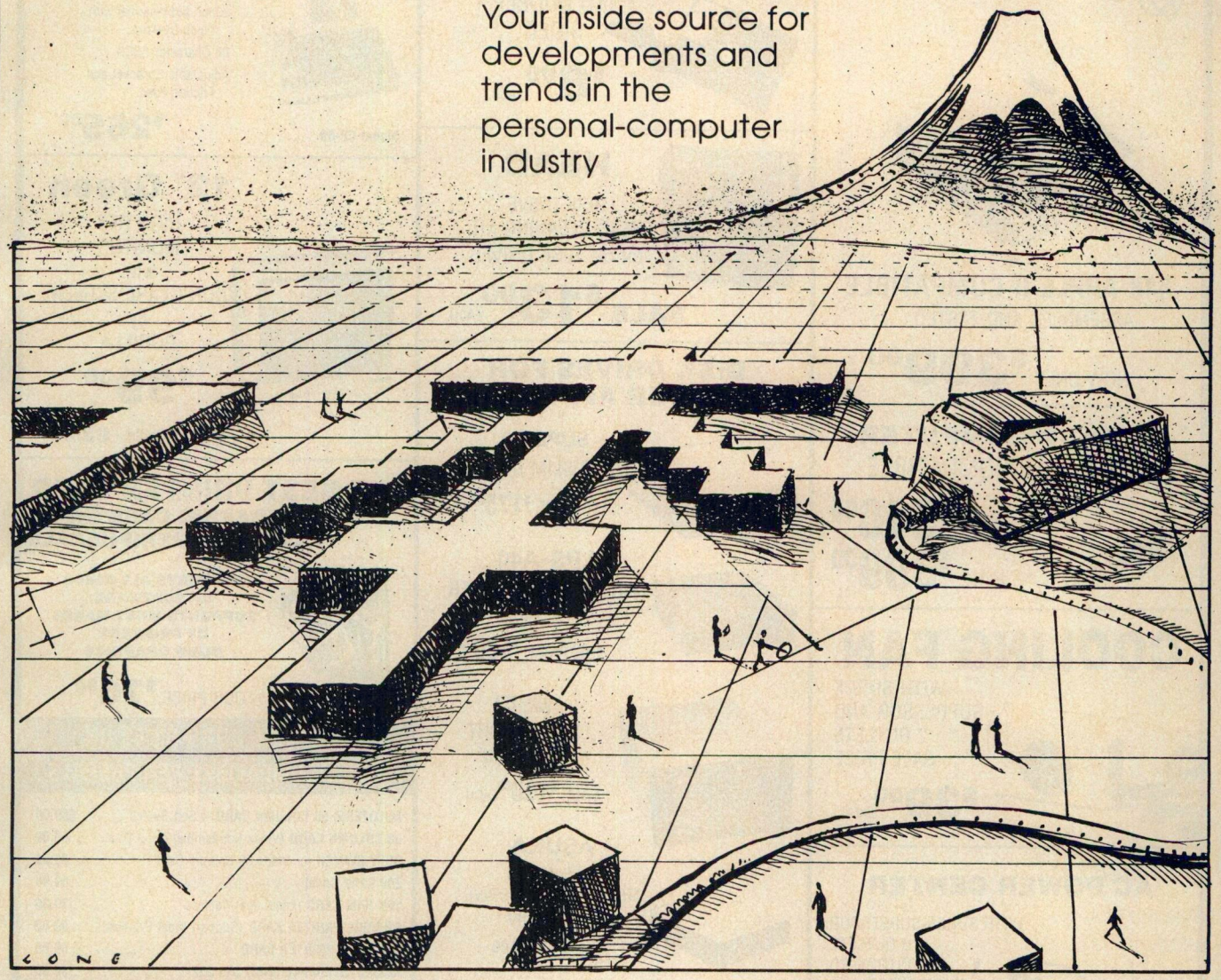
Photography by Barbara Kasten

CIRCLE 310 ON READER SERVICE CARD

# NEWS+

**BY FREDERIC E. DAVIS**

Your inside source for developments and trends in the personal-computer industry




## THE MAC'S FUTURE

I got a glimpse into what's ahead for the Macintosh at the MacForum given last summer in San Francisco by the market-research firm Future Computing. Among the more interesting aspects of this two-day event were various "promises" that John Sculley and Steve Jobs of Apple made. By 1986, they claim, optical-disk technology will be available; the Mac and the Lisa will come with full-page displays able to show an entire 8½ × 11-inch piece of paper at once; there will be a lap-size Macintosh that Jobs calls "Mac in a book"; and UNIX support will be available for the Mac and the Lisa.

Even sooner, according to Sculley and Jobs, a laser printer that produces typeset-quality output will be on the market. The laser printer is so advanced that it contains more RAM and more chips than does the Mac itself.

Another surprise was that spokespeople from both Microsoft and Lotus Development Corporation claimed that their companies were placing a higher priority on producing Macintosh software than on producing IBM PC software.

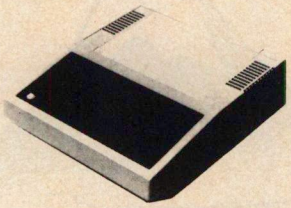
Also at the MacForum, Chuck Colby of Colby Computer in Palo Alto, California, was showing off a modified Macintosh dubbed the Colby Mac. The Colby Mac is an actual Macintosh rebuilt into an Osborne-style carrying case that contains the Mac's circuitry, screen, and two disk drives. The main advantage of the Colby Mac is that it fits under airline seats, whereas the regular Mac cannot. John Sculley looked dubious when he first saw the Colby Mac (it's not as cute as the original Mac), but he was eventually sold on the idea and placed an order for several of the modified Macintoshes.

## JAPANESE LIKE MAC

Apple Computer Japan, Inc., has signed up more than 50 leading Japanese software producers to develop Macintosh application software in the Japanese language. Since the Japanese language is much more graphically complex than English, Japanese software producers feel that the Mac, with its excellent graphics capabilities, is much better suited to their language than the IBM PC type of computer. In order to help these firms get started, Apple is supplying them with a Japanese version of the Mac's operating system, the toolbox, and other development tools. The Japanese Mac has 512K RAM to handle the kana character set and comes with a special kana-syllabary keyboard. This keyboard has keys with graphic elements that combine to form the thousands of characters in the Japanese language.

WILLIAM CONE

# pinecom™



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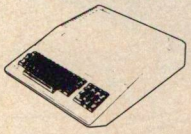

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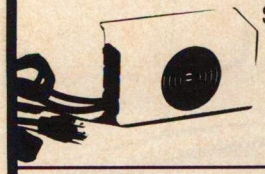

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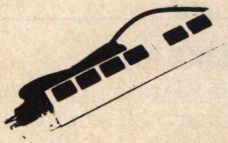

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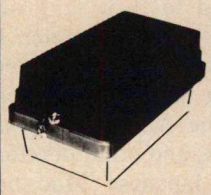

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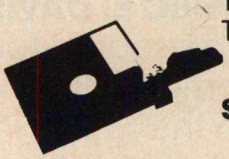

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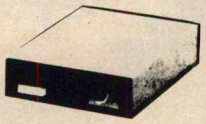

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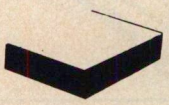

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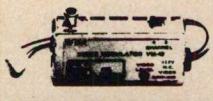

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## ▸ NETWORK BATTLE

The race to come out with local-area networks is heating up. Here are the players lined up at the starting gate: Davong Systems of Sunnyvale, California, with its MacLink and MacDisk for the Macintosh; Symbiotic Computer Systems of Fairfield, Connecticut, offering SyMBfile hard disks and SyMBnet networks for the II, II Plus, IIe, IIc, III, and Macintosh; Sunol Systems of Pleasanton, California, with its Sun*Disk hard disk, Sun*Net network, and Sun*Mac AppleBus network for the Macintosh and Apple II; Tecmar with its MacDrive and planned AppleBus network; and, last but not least, Corvus, offering OmniDrive for the Macintosh, which will be compatible with the company's OmniNet network for the Apple II series and the Apple III.

## ▸ MOUSE ALTERNATIVE

Although I personally like the mouse, quite a few people seem to dislike it. I always thought the logical alternative would be a touch-sensitive pad—you could tap the pad to simulate pressing the mouse button.

KA Design Group of Oakland, California, has come up with another interesting alternative called the Puck Pointer. The Puck Pointer is like a knobby little joystick that is not much larger than a key on a computer keyboard. In fact, you can integrate it into a keyboard quite easily, if you don't like to take your hands away from your keyboard to roll the mouse around.

The Puck Pointer uses a noncontact optical sensor in combination with a light-emitting diode (LED) light source to detect movements precisely. Although the device takes up only four square inches, it has a resolution of 2048 by 2048 points on the screen, which is better than that of most computer displays. To top it off, this device is quite inexpensive, selling for around $15 wholesale.

## ▸ ROBOTS, ANYONE?

If you're interested in robotics, you may want to pick up a copy of the *International Robotics Industry Directory*, which lists more than 250 robot models. The directory is available for $35 from Technical DataBase Corporation, P.O. Box 720, Conroe, TX 77305.

## ▸ TECHNOLOGY ADVICE

Uncle Sam wants to share information about technology with scientists, inventors, and researchers in private industry. To help increase the flow of information, the government has published the *Directory of Federal Technology Resources*, which is available for $25 from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161.

## ▸ CHIP CHAT

Apple's choice of the Motorola 68000 as the processor for the Macintosh and Lisa is turning out to be wiser than IBM's choice of the Intel 8088 family of processors. Not only is the current 68000 superior to the 8088, but the future of the 68000 family looks much rosier than that of the 8088 family. Intel is struggling to produce a smooth upward path for its processors, but Motorola is forging ahead at full steam.

The new Motorola 68020 is a feature-laden superchip with a full 32-bit architecture capable of accessing up to four billion bytes of data. It performs up to 20 times faster than the 68000 in the Mac and the Lisa. The 68020's advanced design uses state-of-the-art HCMOS technology, which consumes less power than the 68000 does. The chip has extended support for coprocessors and features dynamic bus sizing that supports 8-, 16-, and 32-bit bus ports. Thus, the chip can work in existing 8- or 16-bit systems. The best news for Apple is that all the precious Macintosh and Lisa object code written for the 68000 can execute without revision on the more powerful 68020.

## ▸ WOZ WANTED HART

Steve Wozniak, cofounder of Apple Computer, and Regis McKenna, head of Apple's public-relations firm, were both delegates for Gary Hart at the Democratic National Convention in San Francisco last summer. Although their candidate didn't win the nomination, the pair seemed to enjoy the convention and its lavish parties. Woz's participation represented a new interest in politics, but McKenna is an ardent Democrat of long standing.

Word has it that Woz did promote one winner. He was plugging Brøderbund's Print Shop program for the Apple II series, which creates typeset-looking greetings cards, stationery, announcements, and banners. Print Shop is a great program at a great price ($49.95), created by David Balsam and Marty Kahn of Pixellite Software in Berkeley, California. David tells me that a Macintosh version of Print Shop is now on the horizon. +


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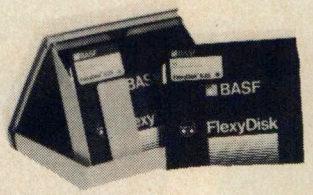


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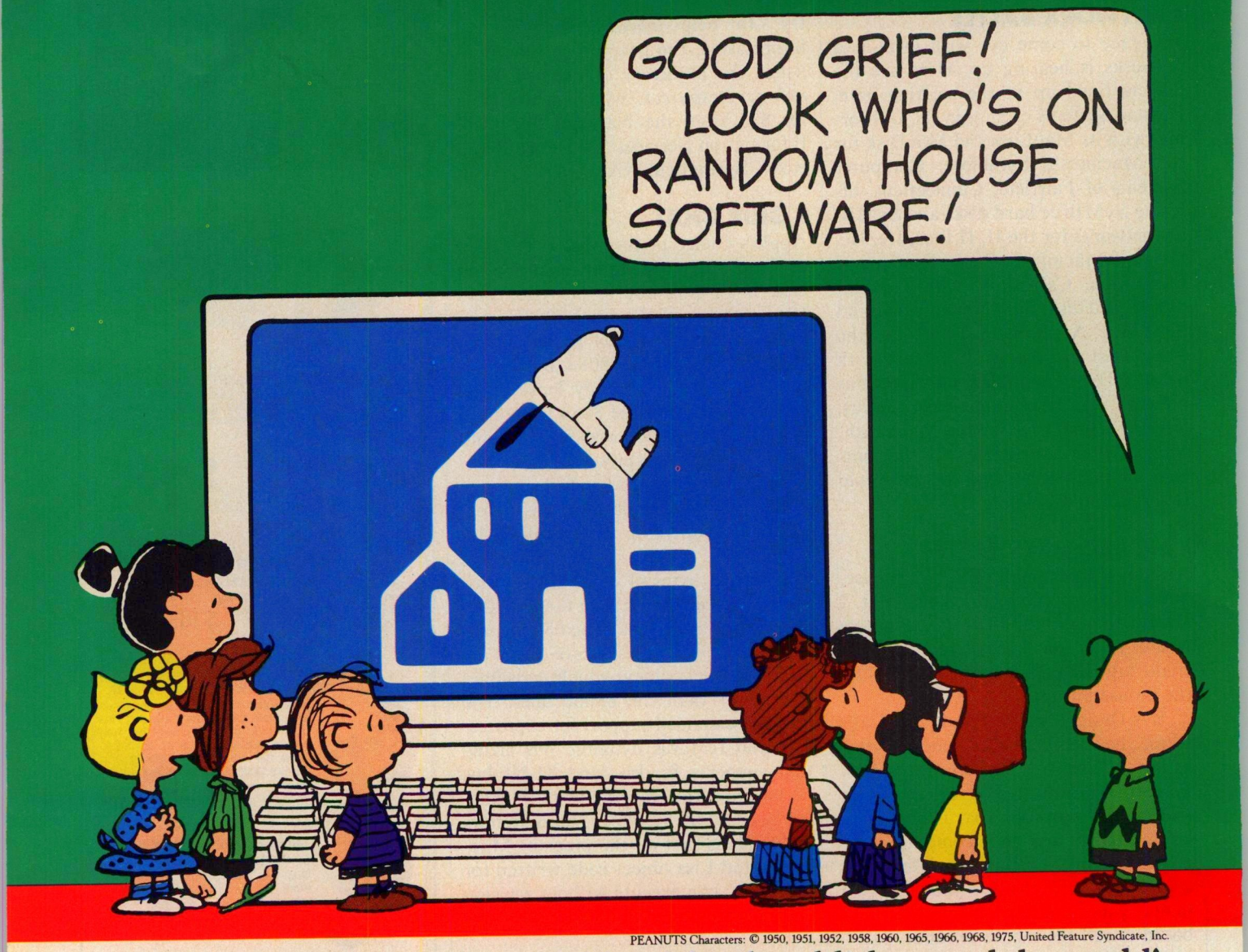


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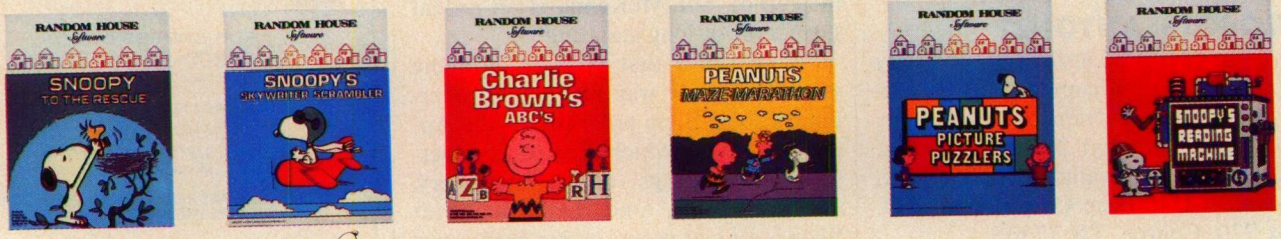


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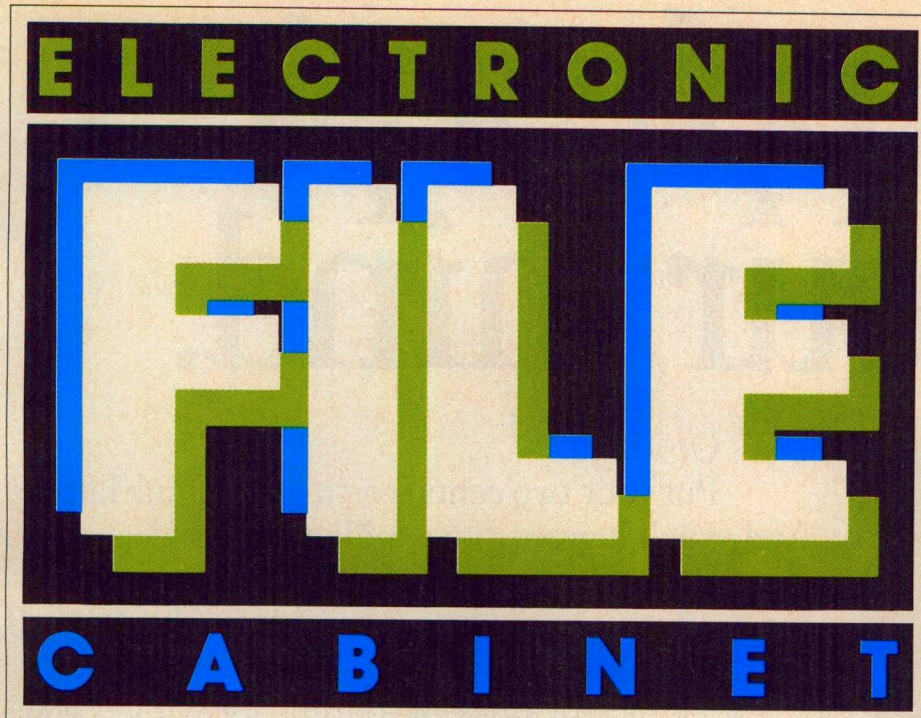


# THE FOURTH VERSION OF DB MASTER COMBINES LARGE CAPACITY WITH EASE OF USE

**▶ SOFTWARE REVIEW/BY JILL MORGAN**

DB Master, one of the early file-management programs for the Apple, shows welcome signs of maturity in its fourth version. The program lets you store information in such a way that it is available in several files at once and can be sorted into groups.

File-management programs such as DB Master have many complex uses, but the basic one I started with, two years ago, was creating a customer mailing list. Because of this program, I can send specialized mailings to targeted customers, based on their product interests and account activity, and my list now comprises 4000 names.

DB Master, Version 3, was the first program I bought for my Apple II Plus. I learned the program by reading the manual, and in my innocence, I didn't realize that the manual was complicated and poorly organized. Maybe that is why I started calling the program DB Monster.

Version 4 Plus is considerably easier to learn and use. The manual is a handsome, clearly written tome. Programmers may not regard DB Master as elegant, but it is useful for data management in small businesses or corporate departments. It also has the largest capacity and the most options of the popular database programs for the unenhanced, non-CP/M Apple II.

**What Is a Database?**

"A data base is a collection of related information," says the first line of the introduction to the DB Master manual. The paragraph continues with a pithy definition: "A true data base manager is a computer programmer's tool, designed to handle information storage and retrieval within larger computer programs, and requiring advanced programming skills. A 'file management system' such as DB Master is a complete, self-contained program designed to help non-programmers manage information."

I am proof that a computer novice, with reasonable patience and the ability to follow a recipe, can set up DB Master. I knew that if I could grasp the program, I could train someone to enter names.

I initially spent 60 hours with DB Master and used it not only to learn about my new computer but also as a primer in data-management strategies. If I had had the well-written Version 4 Plus manual, I might have been able to cut my learning time in half. Because of its instructive content and its depth, the manual could be a textbook in a business class.

To use DB Master, or any file-management system, you should understand a few standard terms. Consider a familiar form, such as a catalog mail-order form. It has lines for name, address, city, state, and ZIP code, as well as boxes to check and columns for item descriptions and prices. With DB Master, you can make your own form, which is called a record. On the form are lines and labels, called fields. Perhaps you will have a field for last name, another field for first name, four for the four elements of the address, another for the old phone number, and other fields for item descriptions, quantities ordered, cost per item, and total costs.

Each form is a record; a group of records makes up a file. Within a file are all the orders for each customer. You can sort the records, using any of the fields as criteria, such as by ZIP or alphabetically by name, and you can search the records to select only those that include certain items such as total purchase amounts. If you want to send a special mailing to everyone in ten states who ordered more than $1000 in the past month, you can have a list or mailing labels within minutes. For organization and for speed in finding records, each record must have a primary key: a unique number or set of characters, such as a customer number or invoice number.

DB Master is like other business tools; it works best if one or two people learn how to set up the system and teach others how to handle the daily use.

**A Manual for Everyone**

The DB Master Version 4 Plus manual gives information that satisfies any reader's need to know or ability to absorb. Within the covers of its small three-ring binder, it is divided into logical sections. Instructions for novices on starting the computer are separate—more advanced people can skip that section and start with the tutorial. In seven lessons, the 178-page tutorial leads readers through a sample file setup for Nose to the Grindstone Gravel Company. Messages that appear on the computer screen appear on the page in easy-to-spot bold type, which is helpful for experienced and novice users alike. The reference guide that follows the tutorial is a 96-page, alphabetical listing that succinctly defines DB Master terms and functions.

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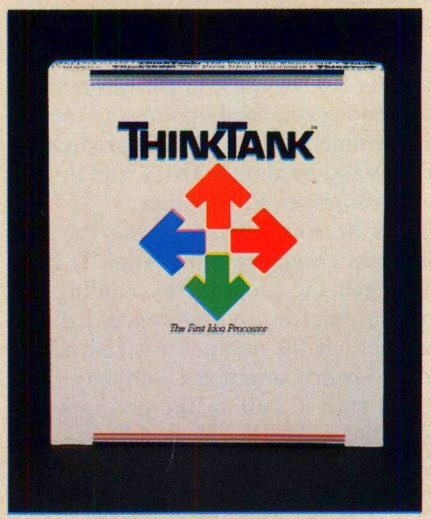


The First Idea Processor.

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manual, preferring to learn the program through trial and error, will appreciate the programmers' tool. This graphically pleasing flowchart poster shows the structure of the program.

The manual's appendix offers helpful information, including the only instructions on what to do with the sample disk that comes with the program. I found this section only after I had managed to figure out what to do with the disk.

Stoneware, Inc., developer of DB Master, will send you a 23-page essay on the strategy of good file design, upon receipt of your registration card. The company wants to be sure it can send

**I am proof that a computer novice, with reasonable patience and the ability to follow a recipe, can set up DB Master.**

you updates and newsletters, so it emphasizes the necessity for customer registration. With Version 3 of DB Master, it sent backup disks for the program upon registration; with Version 4 Plus, a set of backups to the two-disk program comes in the package. Also enclosed is the sample files disk that contains four sample files and also allows you to convert files you've created with PFS software (from Software Publishing Corporation) or with VisiFile to DB Master files.

Don't be alarmed that DB Master comes on three disks. You need to use one of them only rarely to create a new file and to do some file housekeeping. The improvements in Version 4 Plus need the disk space and are well worth the occasional, minor inconvenience of inserting another disk.

In addition to the thorough manual, DB Master Version 4 Plus presents several major improvements to Version 3. All aspects of the program have at least one new function that remedies a previous drawback. When you create a file and its screen form, you can now edit freely—you don't have to restart whenever you want to change something. Making a new file form in Version 3 often gave me the edgy feeling of being in an amusement-park spook house. If I


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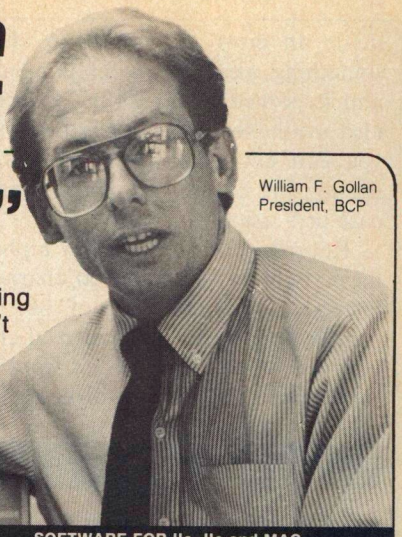

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made an error or wanted to change something, a cackling witch jumped out and screeched, "Start over!" Editing is also available during record entry, so you can change information without erasing the entire line, which was the case in Version 3.

Records can now contain alphanumeric fields with up to 100 characters instead of a maximum of 30. This change does mean that files you create with Version 4 Plus may not work with the Version 3 program, although files you create with Version 3 will work with Version 4 Plus.

**Making a new file form in Version 3 often gave me the edgy feeling of being in an amusement-park spook house.**

Changes in the printing portion of the program are especially welcome. Before you print a report or labels, you can review the formats that determine the appearance of the information in the printout—no more wasted time creating duplicate formats. In selecting which records to print, you can now match up to 20 criteria, which was supposed to be possible in Version 3 as well, but Version 4 Plus won't crash when you get to the 10th or 11th criterion.

To extract the records you choose, DB Master may need to make a separate Sort file on "scratch" disks. This process can take a long time. In Version 3 you could use the sort file only once. In Version 4 Plus you can reuse that sorted file, although you must remember that any changes you've made to the main file since the sort will not appear on the previously sorted file.

The most important characteristic of Version 4 Plus is its reliability in carefully storing and retrieving data. I have never suffered a data loss because of the program itself; even the errors I've made in interpreting instructions have not proven catastrophic.

DB Master constantly displays options on the screen, which might annoy advanced computer users, but I appreciate them because I know I can check the choices at the bottom of the screen and move through the program without hesitation. In Version 4 Plus, the new headings at the top of the screen that tell me where I am within the program have proven helpful.

**Entry/Edit Techniques**

To avoid typing repetitive information, you can set defaults that pretype specified information into the screen form. A last-record default option causes the record you have just entered and saved to reappear on the screen, and you type over it to enter a new record. You can use this function to review your previous entry for errors and to avoid retyping if some of the information within a batch of new records is similar. If you need to add five new records of people at the same company, for example, enter the first name, title, company, and address. With last-record default, type only the name and title for the next four records.

Another option is to set up permanent defaults during file creation or temporary defaults just before adding records. Fields with the same information for all or most new records can already be filled-in when each fresh form appears on the screen. If most records will include the title Sales Director, for instance, or will have the same city and state, defaults in these fields can save typing time and help prevent errors.

Before adding records you can choose to set defaults and to print each of the new records. DB Master has always made it easy to produce a daily report of the records you enter by letting you print each record as you save it. The new version improves this feature by letting you use a space-saving format, printing all fields on one line across the page, instead of having only one field per line.

Another way to print a daily report is to set up the original form with an automatic-date field. Whatever date you enter when you boot DB Master is logged automatically into this field on any records you enter or edit that day. At the end of the day you can print a report of all records for that date. I also use this field as a last-activity date, separate from another field for the record's original entry date, to show when customers have made their most recent purchases. By printing a report of all records with last-activity dates prior to six months or one year ago, I can spot customers who are not buying.

An increment option makes entry of numbers easy. Many DB Master options use the Control key and a single-key mnemonic. Control-I, for instance, causes a number to increase by 1. Whenever the form appears, to have you add the next record, the increment option adds 1 to a number from the previous record. For invoice numbers or unique, primary-key numbers, the increment ups the previous record's number and saves both typing the entire number and remembering which number comes next.

DB Master allows a certain amount of data-entry checking by providing for specific field types. If you set up your form with fields for date, telephone, or Social Security number, for example, you can use a field type that makes the typist conform to the spacing appropriate for that information. You can select a Yes/No field that accepts only Y or N, or a field that formats dollar amounts to two decimal places.

You can also choose a field that includes only numbers and can set the maximum length to fit a specific type of entry, such as catalog number. The program won't allow you to type a longer number, and a shorter number that may be incorrect will stand out.

You can make two fields part of a formula and create computed fields. For example, one field includes the quantity of an item in inventory, another field tells how much it costs, and the computed field shows the calculated total inventory value for that item.

To give you room to enter text, alphanumeric fields can include up to 100 characters. You can combine several 100-character fields into a paragraph of text that includes any keyboard characters.

**The most important characteristic of Version 4 Plus is its reliability in carefully storing and retrieving data.**

Editing records is the most time-consuming part of maintaining a database system. DB Master makes this process simpler in several ways in Version 4 Plus than it was in Version 3. One is the alphanumeric-field editor, which lets you edit a field without having to retype it entirely, as you had to in Version 3. Imagine not being able to edit a 100-character field! DB Master's field editor is a simple word-processing editor. You can move to the beginning or end of a line, delete characters, and insert characters. You can use it while

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adding or editing records and when you set temporary defaults. If you don't like your editing, you can press Control-V to void it and retrieve the original record. If, on the other hand, you like it, press Control-S to save it.

Another helpful way of using the editor saves time much like the default option does. If you have a new record to enter that contains information similar to that in another record, call that record to the screen, edit it, and press Control-A to add the record as a new one without altering the original record.

**Data, Front and Center**

Now that you have the information in the computer, how do you get it out? As usual with DB Master, the options are many and can be complicated if you don't have a good understanding of the instructions. What you want the program to do is search through the records to find each one that matches a set of criteria you choose. You can display them on the screen or print them with the printer.

The program lets you find records that match; are greater than or less than; include a specific character, number, or set of letters; or records that fit within a range. You can combine these criteria and find only records within a ZIP code range that include a certain letter code. You can choose records that fit one set of criteria *and* another set, or records that fit one set *or* another set. Thus, you can combine records in many different ways to suit your needs. In effect, you have duplicate copies of information in many file folders at one time with the option of updating or reprinting reports with little effort.

**You won't always know how to get off a trail you know you don't want to be on until you follow the program further into the woods.**

Another Version 4 Plus improvement is the feature that enables you to get a count of the number of records that fit the criteria you specify, before you print the report. Some weeks before printing mailing labels, I need to know how many flyers or letters to print. When I choose the Total option, Control-T, the program searches the file. Total also gives a sum, average, and standard deviation for numeric fields and prints the results on the screen or printer. Statistical analyses are also available through printed reports.

Creating a report, like creating a form, is easiest when you plan it on paper first. Within the DB Master manual are several blank Report Design Worksheets and Form Design Worksheets. Each design takes time and can be tailored to special needs. A form can fill up to nine screen pages and include 21 lines of fields per page, with a maximum of 100 fields per record. Reports can print one or more lines per record, in a layout to fit a form, or in labels. Reports can include a little or all of a record's data, as well as comment lines, footnotes, column titles, date, page numbers, statistics, and breaks at the end of groups or pages.

**Lost in the Woods**

DB Master can be frustrating. With its many options for creating forms and reports, mistakes and improvements take time. If people in business had more time, DB Master might be considered an adventure, but once you've selected an option, or started a hike, you won't always know how to get off a trail you know you don't want to be on until you follow the program further


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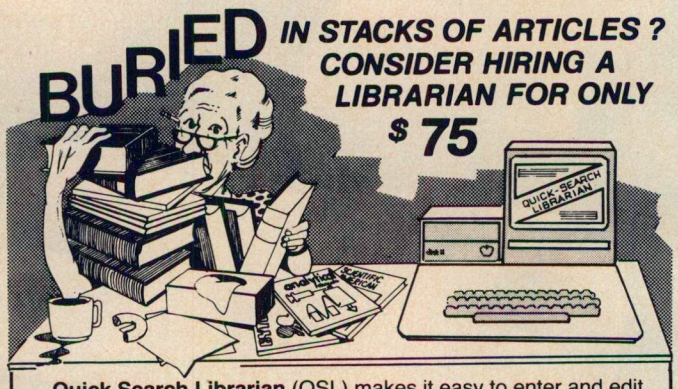


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a clearing you will ancel the trip or start oint along the way. It is to stay on the trail by with the program's options, hich will let you abort the cur- ocess, rather than to cut through woods by pressing Control-Reset. e latter procedure may or may not work—if it doesn't, it may damage your file. When you follow them literally, the screen prompts, like trail markers, help avoid confusion.

Because of the potential size of a file, DB Master can require an annoying amount of disk swapping in order to read or write records in a sort. The best way to surmount this problem is to use a mass-storage device such as a hard disk or design a file so that the most common sort field is the start of the primary key.

If you need to sort records in many different ways, a hard disk may be the better answer. Check with Stoneware when you want to choose a hard disk, because DB Master is not yet compatible with all hard-disk brands—you'll find that the company offers excellent technical support.

**Utilities to the Rescue**

If you use DB Master as a professional tool, the many file-maintenance routines the program offers will help you. DB Master Version 4 Plus includes two additional Utility Pak programs from Stoneware. File maintenance in DB Master includes a simple and helpful task: reblocking to reorganize and condense the records. The utility programs also have routines to determine the total number of records within a file, add and delete secondary keys for fast screen searches, translate abbreviated fields into long definitions, change passwords, and configure (i.e., connect) a printer to work with the program.

The Utility Paks include several useful tasks and some esoteric abilities. Utility Pak 2 includes a program for printing labels up to five across a page, which is especially useful for direct mail. Its global edit is helpful for automatically editing or deleting a selected group of records and for computing days elapsed between dates. For companies that work with DB Master in different offices and need to merge records, each Utility Pak has an appropriate routine.

Utility Pak 1 includes basic help for creating a new, blank file with an original's formats and for recovering damaged files. It also contains a DIF translator to allow a DB Master file and a file from another program to merge information.

DB Master cleans up myriad details in any paperwork routine and builds a system that can grow into a hefty workhorse on your Apple. Whether you print and file invoices, calculate estimates, keep personnel records, or maintain a library catalog, DB Master can help. The program gives you fast access to your information and an opportunity to analyze it, print it, and improve its usefulness. +

## ▸ PRODUCT INFORMATION

**DB Master, Version 4 Plus**
Stoneware, Inc.
50 Belvedere Street
San Rafael, CA 94901
(415) 454-6500

**List Price:** $350 (includes Utility Pak 1 and 2)

**Requires:** Apple II Plus, IIe, or IIc; 64K RAM, two to four disk drives (does not work on Apple III in Apple II Emulation mode)

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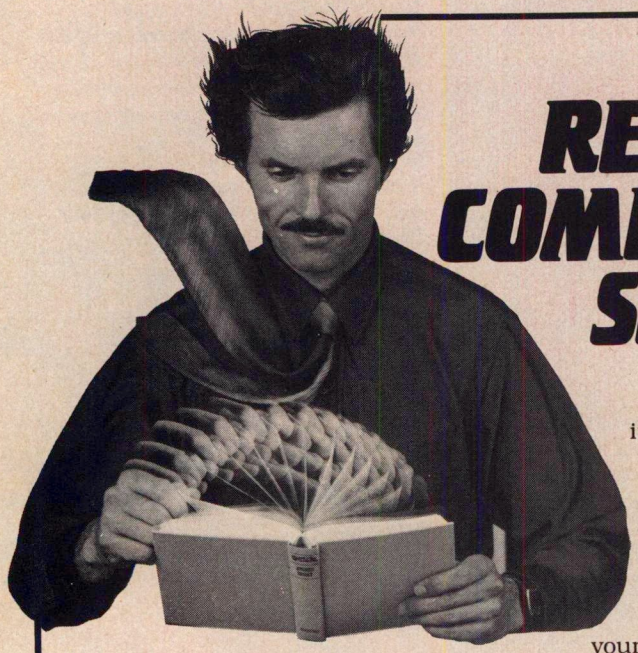

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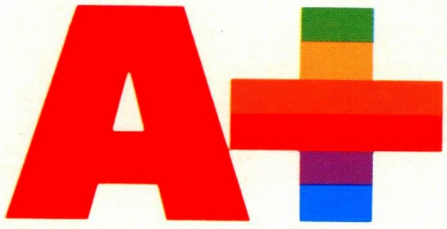

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# programming contest

## Send in for Your Listing

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1. Write to us, and we'll send you a copy. Be sure to state the name of the program, the month that it won, and include a self-addressed, stamped envelope.
2. Download the program directly into your Apple from CompuServe. Log onto CompuServe (you must already be a member) and type GO PCS51, which will bring you to the Micronet Apple User's Group area. The computer will then guide you through the system with a series of menus and help screens. If you have any questions, you can send a message directly to us via CompuServe's electronic-mail system. *A+*'s ID number is 72356,2673. If you want to contact CompuServe, its phone number is (800) 848-8199 (in Ohio, dial (614) 457-0802).
3. Watch *A+ Disk Magazine* for listings of our contest winners. Future issues of *A+ Disk Magazine* will have the winning program, ready to run, on the diskette.

## ▶ CONTEST WINNER

*Take a bow, Mark Bisho, winner of October's Program of the Month contest. He will receive $500, and we'll enter him in our special $1000 grand-prize contest. Mr. Bisho's comments describe the program:*

## IntelliCalc

IntelliCalc knows how to do everything that a normal calculator does, plus almost everything else you wish one did. It is simple and easy to use, yet potentially a powerful program—hence the name IntelliCalc. If you have ever spent hours running and checking a calculation, with or without a tape, only to find a mistake or a deleted entry, you will really appreciate the capabilities of this program.

IntelliCalc provides a running total that is updated with every entry. As many as nine memories, available at any time, are fully interactive with the running total and you can access them directly from the keyboard without affecting the normal entries or the total. You can insert—or revise—an entry at any time into an easily rechecked "electronic tape" of entries. It is also possible to save and load information to and from the disk. The program can print a hard-copy calculator tape that is correct every time. Well-documented subroutines are included to expand the program to meet your own calculation needs.

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| C | ITALICS | I | 10 LINES/INCH |
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M EMPHASIZED DOUBLESTRIKE
N DOUBLEWIDE EMPHASIZED
O DOUBLEWIDE EMPHASIZED DOUBLESTRIKE
P CONDENSED DOUBLEWIDE
Q CONDENSED DOUBLEWIDE DOUBLESTRIKE
R CONDENSED DOUBLESTRIKE
S CONDENSED HALF SIZE
T RETURN TO STANDARD SETTINGS

> TYPE LETTER, PRESS RETURN (0 ENDS)

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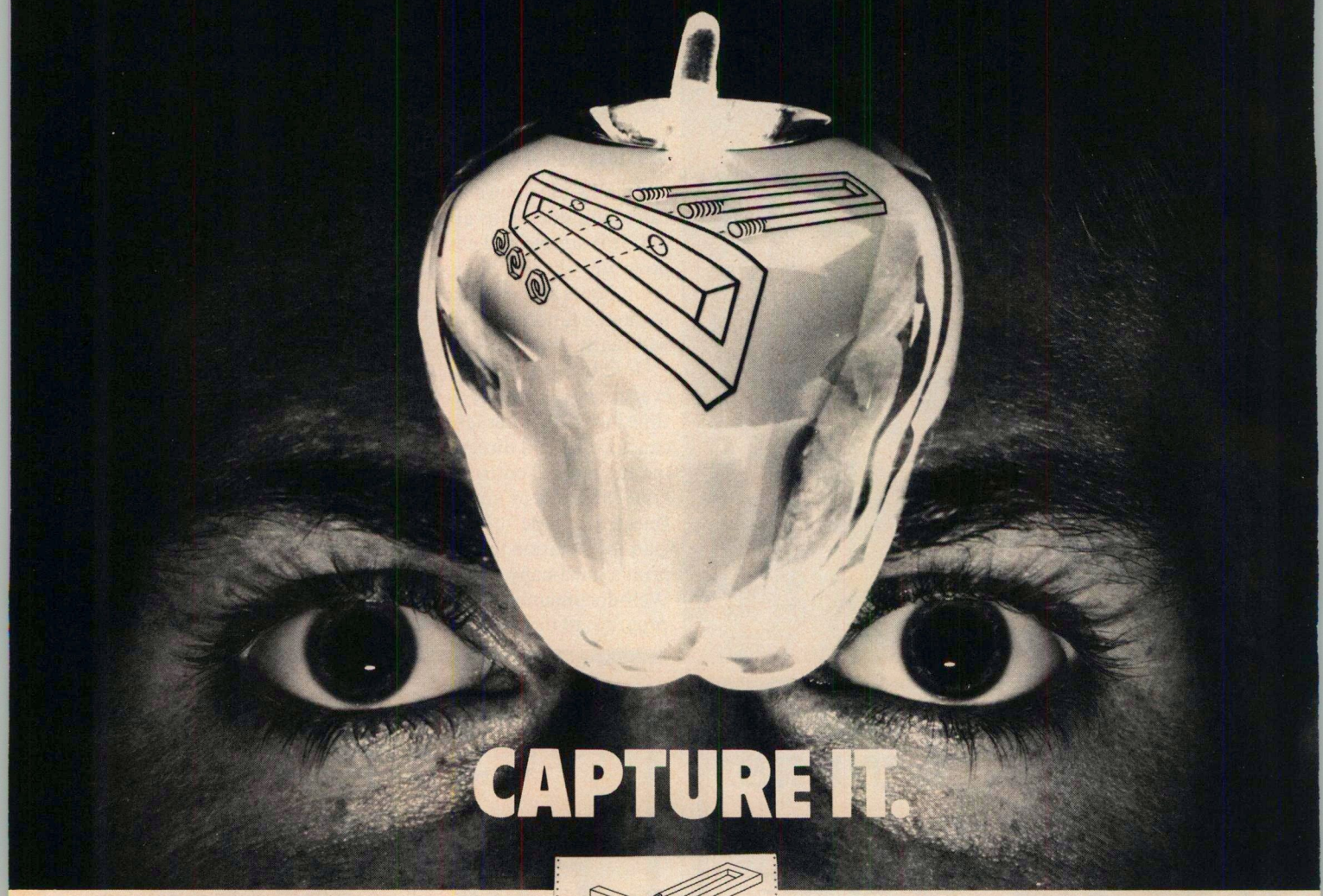

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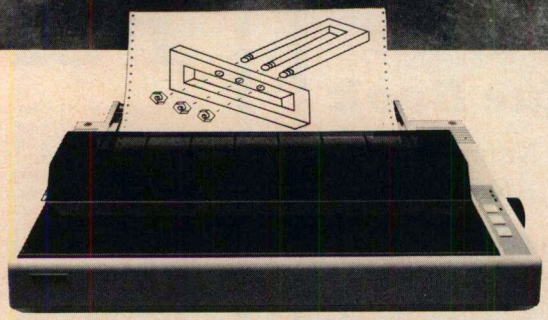

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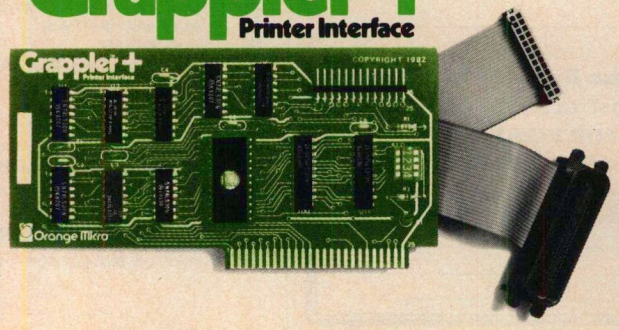


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# HOW TO dBASE II

## PART XII

**In a tutorial series on dBASE II, a popular program for database management**

Welcome to our ongoing series of tutorials on the increasingly popular microcomputer data-management tool dBASE II. If you have been participating in the 11 dBASE II installments up to now, you should now be fairly adept in many of the rudimentary, as well as some of the more complex, techniques for creating databases, storing information in them, and keeping that information up to date. You should also be familiar with most of the approaches for data retrieval, including the use of sorted and indexed databases, as well as operators, memory variables, functions, and more global commands such as Total, Update, Copy To, and Append From, which accomplish large-scale modifications of and interactions between existing data files.

For the most part, past installments have directed your attention to the tedious and irrelevant details of unknown or entirely fictitious businesses, because of the necessity for examples. You've suffered through the prices and quantities of wing nuts, the part numbers of $15 phonographs, and the cost/benefit ratio of lead space suits. Therefore, as a reward, I now offer something a bit more fun. This time we'll be playing with ways to create custom data input/output screens and printouts using the ZIP.COM program.

Before we get started, though, here are a few important points for newcomers to the dBASE tutorial series.

**Tutorial Conventions**

These tutorials contain numerous examples. Sometimes you are asked to type a command, and then dBASE II responds. Just to differentiate between what you do and what dBASE II responds with, the ones you type appear in lowercase letters. Uppercase works too, so it doesn't really make a difference; it's just clearer this way. Some examples may specifically ask you to type in uppercase, but they always involve a series of words between quotation marks. The dBASE II responses are usually in uppercase letters. All screen interactions are listed in larger type to distinguish them from the rest of the text. To make these sections more readable, carriage returns are implied rather than included here.

In the command-syntax examples, words between square brackets (e.g., [scope]) indicate an optional phrase or "argument." All examples assume dBASE version 2.4 or higher and an 80-column display.

**Screen Gems**

Have you ever wished there were an easy way (without writing dBASE programs) that you could display and enter data into your dBASE files, using your own custom-designed screens? Wouldn't it be nice if you could list the cursor-control codes or special instructions and prompts on the screen during the Append and Editing processes?

Well, it's not as difficult as you may think.

A program included on your dBASE II disks is named ZIP.COM. Ever wonder what it's for? Well, it's a screen and printout editor that is designed expressly for use with dBASE II. Zip makes a simple task of creating custom screens and printout forms, saving them on disk as .FMT files. dBASE II 2.4 or later sports a command (Set Format to <filename>) that instructs dBASE to use an .FMT disk file to determine the appearance of your screen. Additionally, for the dBASE II programmers among you, Zip can also help you write all the code necessary for displaying fancy screens from within your programs. Let's find out more by actually using Zip.

First, make sure to run the installation program, ZIPIN.COM, and answer the questions according to your system's configuration:

```
A>ZIPIN <ret>
```

Assuming you have a bona fide Apple version of dBASE and not a generic CP/M one, your choices are relatively simple. Specify 40 or 80 columns and Apple II or Apple III. Don't bother changing anything else, except perhaps the cursor-control keys so that they match your word-processing program. Then exit from the program, using F for *finished*.

Next, dredge up the database we used in the last issue, or create a new one with the name, field layout, and data in figure 1.

OK. Now let's run Zip and see what we can do with it. First, make sure you have at least 3K of space on your floppy disk. Then type

```
A>ZIP <ret>
   press any key to continue
   N (for new)
   TUTOR (that'll be our filename)
```

Now you should have an almost blank screen waiting for you to start typing. Notice that you can type anywhere on the screen by moving the cursor around with the cursor-control keys you chose during installation. Also, moving down a line doesn't send you back to the left margin or to the end of the next line, as is often the case with word-processing programs such as WordStar. This difference arises because the entire screen is initially filled with "blanks" waiting for whatever you want to replace them with.

In this first example, we are going to create a data I/O (input/output) screen that we can use when we Append or Edit our Inv-1 data file. So create a screen that looks something like the one below, including some little message about careful typing at the bottom of the screen. You can tailor everything to your liking, except for the field names (which must, of course, match the database in use). The field names can go anywhere on the screen, as long as you have enough room for the data display. Note that a # sign must immediately precede the field names.

**The field names can go anywhere on the screen, as long as you have enough room for the data display.**

```
                **** APPEND OR EDIT ****
            INPUT SCREEN FOR INV-1 DATABASE

Category        ---------->>      #category
Part Number     ---------->>      #part:numb
Brand           ---------->>      #brand
Model           ---------->>      #model

List price      ---------->>      #price
Actual cost     ---------->>      #cost

Number on hand  ---------->>      #quantity

Please type carefully. Use dBASE cursor control
keys to move between fields, edit, and insert.
```

*Figure 1: The Inv-1 file*

```
STRUCTURE FOR FILE: A:INV-1.DBF
NUMBER OF RECORDS: 00010
DATE OF LAST UPDATE: 00/00/00
PRIMARY USE DATABASE
FLD        NAME            TYPE        WIDTH        DEC
001      PART:NUMB          N           005
002      CATEGORY           C           010
003      BRAND              C           010
004      MODEL              C           006
005      QUANTITY           N           002
006      COST               N           006          002
007      PRICE          N          006          002
*TOTAL*                                00046
.list
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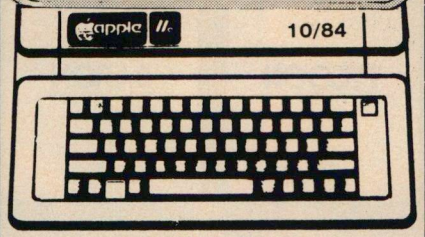


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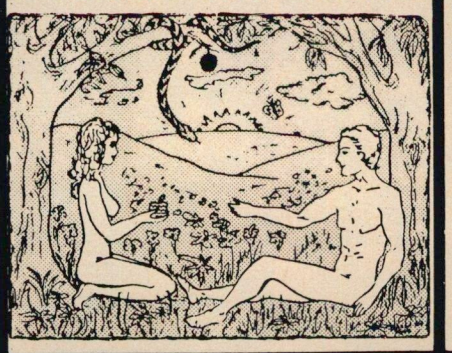

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Once you have the screen looking the way you want, type /S to save the file. Then type F to tell Zip to create a format (.FMT) file rather than a command (.CMD) file. We don't want to change the name, so type N in answer to the name-change question and N for the question about printing the form. Now Zip starts processing the screen, creating three files on your disk. When the cursor jumps back into the editing area, type /Q to quit Zip, answering Y to the Quit to system (Y/N)? query.

Just for fun, let's see what Zip created. Either use the CP/M Type command on your word-processing program to view the file TUTOR.FMT in figure 2.

This is a file that dBASE can use to place field data and notes on the screen while you're appending, editing, or inserting records. If you'd needed to, you could have created this form with your word-processing program. You can also edit it with the WP program, assuming you use a "nondocument" mode designed for writing programs. Otherwise, the WP program sometimes inserts strange control codes into the file, which confuses dBASE. Writing this format file by hand would have required some time-consuming calculations. For example, the line

```
@2,26 SAY "**** APPEND OR EDIT **** "
```

means

```
"at row two, column 26 print this message--->
          **** APPEND OR EDIT **** "
```

The other files that Zip creates have the extensions .ZPR and .ZIP. The .ZPR file looks just like the screen we created. Editing the .ZIP file with your word-processing program will probably damage it, so it's better just to type it out:

```
A>type tutor.zip
```

This file is the one Zip uses to store your screen for future editing.

Now, get into dBASE II, making sure that your Inv-1 database and our new TUTOR.FMT file are both resident

```
* TUTOR.FMT
@  2,26 SAY "**** APPEND OR EDIT **** "
@  4,22 SAY "INPUT SCREEN FOR INV-1 DATABASE "
@  5,21 SAY "------------------------------ "
@  7,21 SAY "Category  ---------------->>"
@  7,47 GET category
@  8,21 SAY "Part Number  -------------->>"
@  8,47 GET part:numb
@  9,21 SAY "Brand  -------------------->>"
@  9,47 GET brand
@ 10,21 SAY "Model  --------------------->>"
@ 10,47 GET model
@ 12,21 SAY "List price  ---------------->>"
@ 12,47 GET price
@ 13,21 SAY "Actual cost  --------------->>"
@ 13,47 GET cost
@ 15,21 SAY "Number on hand  ------------->>"
@ 15,47 GET quantity
@ 19,13 SAY "Please type carefully. Use dBASE
  cursor control "
@ 20,13 SAY "keys to move between fields, edit,
  and insert. "
```

*Figure 2: The TUTOR.FMT file*


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• Uses Shugart SA390 Mechanics • 143K formatted storage • Color matches Apple Computer • Works w/Apple Controller or other Apple-compatible controllers (ACC-1) • Complete with connector — just plug into your disk controller card • 35 tracks • Size: 6"L x 3½"W x 8-9/16"D • Weight: 4¼ lbs.

**ADD-514. (Disk Drive). $179.95**
**ACC-1. . . (Controller Card) . $59.95**

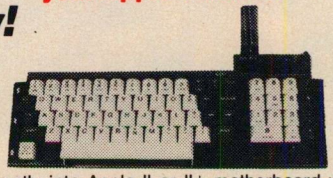
## APPLE™ Compatible 5¼" Half-Height Disk Drive

• Uses Chinon Pinch-type mechanics • 163K unformatted • 40 tracks • Super quiet • Works with Apple Controllers or other compatibles (ACC-1) • Complete with connector — just plug into your controller • Size: 5¾"W x 1⅝"H x 8"D • Weight: 4 lbs.

**FO51APC. . . . . $189.95**

## Keyboard with Numeric Keypad for your Apple II and II+*

*New!*



• Plugs directly into Apple II or II+ motherboard with 16-pin ribbon cable connector • 26 special functions • Size: 14"L x 5½"W x 1½"H • Color (keycaps): white/grey • Weight: 2 lbs.

**KB-A68. . . . . $89.95**

## 80-Column plus 64K RAM for your APPLE *IIe**

Now you can double the memory capacity and get an 80-column display format for your APPLE *IIe** computer at an affordable price. Just plug the JE864 card into your APPLE* and expand your display to 80 characters per line. Perfect for word processing. The JE864 also features 64K bytes of additional memory to allow programming not possible with standard APPLE *IIe** computers. Complete documentation included.

**Board:** High density board design squeezes 64K bytes of RAM onto a 2½" x 4½" board • Fully tested to assure proper operation.

**Uses:** Word processing — displays 1000 more characters per screen • Extra memory allows running of extremely large programs • Ultra High Resolution Graphics capability.

**JE864. . . $124.95 ~~$149.95~~**

## Numeric/Auxiliary Keypad for your APPLE *IIe**

The JE614 is a newly introduced numeric/auxiliary keypad for the APPLE *IIe.** It offers the flexibility of a 10-key pad and the convenience of 23 directly accessible functions. Screen manipulating functions make word processing a snap and cursor controls make the keypad ideal for VisiCalc** users. The JE614 Keypad is housed in a durable metal enclosure and is color-coordinated with your APPLE *IIe* computer. Operation of the keypad can begin within minutes from unpacking. Special functions include: Home, Clear, Clear to End of Screen, Scroll-Up, Scroll-Down, Tab, Delete, Left, Right, Up and Down. Each key has auto-repeat. Size: 5⅞" L x 4-3/16" W x 1¼" to 2½" Slope.

**JE614 . . . . . $89.95**

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**VisiCalc is a registered trademark of Visi Corp. Inc.

CIRCLE 276 ON READER SERVICE CARD

on either the A: or the B: drive (the examples assume the default drive). Then type

```
. use inv-1
. set format to tutor (or b: tutor if it's in drive b)
. append (go ahead and add one record)
. edit 5 (edit record 5, or walk through the database using Control-R and Control-C)
```

If you did everything correctly, your new data-display format should have appeared, along with some data, allowing you to walk through the fields, make changes, and the like. Easy, wasn't it?

**Rules and Notes**

Now that you've got the general idea, you need a few additional pieces of information:

1. You can create as many format files as you want, although only one can be active at a given time. If Bill likes a particular format and Mary another, just make two format files with Zip, naming them Bill and Mary. Then Bill can simply type Set format to Bill before beginning work. Ditto for Mary.
2. Pressing // while in Zip gives you a menu of Zip editing commands and defaults. You can easily center text, insert lines and columns, draw vertical and horizontal lines, and so on. Try playing with some of these options to spruce up your display.
3. If you just want to display data, either on the screen or on paper, you must replace all of the # signs with @'s. This substitution does prevent editing and appending, of course.
4. To print a form rather than looking at it on the screen, change all the #'s to @'s and choose C when saving your file in Zip. Then answer Y to the question about printing. Once you're in dBASE, turn on your printer, locate the record you want printed, and type Do <filename>. For example, suppose the file was saved as tutor2:

```
. use inv-1
. do tutor2
```

One record will be printed in your customized form.

So there you have it: a simple way, without programming, to give your dBASE II files a customized appearance. Programmers will find Zip almost indispensable, since it eliminates the hassle of estimating where prompts will appear on the screen. They can also forget about having to type @14,20 SAY . . . ever again—Zip does it all. Just create a screen and let Zip create a .CMD file. You can later pull the .CMD file into your program with your word-processing program and eliminate the drudgery. Have fun experimenting!

**Programmers will find Zip almost indispensable, since it eliminates the hassle of estimating where prompts will appear on the screen.**

Any thoughts? Write to me, Robert Cowart, and let me know, c/o *A+* Magazine, 11 Davis Drive, Belmont, CA 94002. ✚

dBASE II is a trademark of Ashton-Tate.


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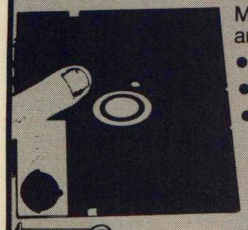

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| | |
|---|---|
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## Apple Accessories:

| | |
|---|---|
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| Koala Pad Apple Vers | $ 69.00 |
| Koala Pad Other Vers | $ Call |
| Kraft Apple Joystick | $ 34.95 |
| Kraft Joystick (Other) | $ 34.95 |
| Thunderclock | $115.00 |

## IBM Hardware

| | |
|---|---|
| AST 6 Pack Plus | $255.00 |
| AST 6 Pack Plus 384k | $595.00 |
| Hercules Graphic Card | $339.00 |
| Paradise Multi Display Card | $425.00 |
| Tecmar Graphics Card | $525.00 |

## IBM Computers:

| | |
|---|---|
| IBM 256k 2 320kb Disk Drives | $2095.00 |
| IBM XT w/10MB Hard Drive | $3795.00 |

**100% Pure IBM Equipment**

## Monitors:

| | |
|---|---|
| Amdek Color I Plus | $279.00 |
| Amdek Color II Plus, 13" High Res RGB | $425.00 |
| Amdek Color III 13" RGB Med Res | $350.00 |
| Amdek 300 Green | $129.00 |
| Amdek 300 Amber | $149.00 |
| Sakata Color SC-100 Med Res | $239.00 |
| Princeton HX-12 RGB Hi-Res Color | $475.00 |

## Printers:

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|---|---|
| C. Itoh Prowriter 8510AP | $329.00 |
| C. Itoh Prowriter 1550 (15" Carriage) | $520.00 |
| C. Itoh Hot Dot (180cps) | $450.00 |
| C. Itoh Hot Dot (180cps) Color | $520.00 |
| C. Itoh A10 20cps Letter Quality | $500.00 |
| C. Itoh F10-40cps Letter Quality | $989.00 |
| Epson RX-80 | $279.00 |
| Epson FX-80 | $469.00 |
| Epson FX-100 | $699.00 |
| Gemini 10x | $269.00 |
| Gemini 10x IBM Version | $279.00 |
| Gemini 15x | $ Call |
| Okidata 92ml | $420.00 |
| Okidata 93ml | $650.00 |
| Cables for Above Printers (Specify From What Computer) | $ 26.00 |
| Ribbons for Above Printers | $ Call |

## DISK DRIVES

Tandon TM100-1

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## Specials!!!

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**Free Subscription To The Source**

**Signalman 300/1200 Modem**

**Hayes 1200 Software Compatable**
**$239.00**

## Modems:

| | |
|---|---|
| Hayes 300 Baud Smartmodem | $199.00 |
| Hayes 1200 Baud Smartmodem | $469.95 |
| Hayes Micromodem IIe | $229.00 |
| Hayes 1200B Smartmodem IBM Internal | $390.00 |
| Hayes 1200B Smartmodem IBM w/Smartcom | $410.00 |
| Novation J-Cat | $100.00 |
| Novation Applecat II | $229.00 |
| Novation Applecat II 212 System | $399.00 |
| Novation Smartcat 300/1200 | $399.00 |
| Prometheus 1200 | $349.00 |
| Prometheus Options | $175.00 |
| Signalman 300/1200 | $239.00 |
| Signalman Mark I | $ 69.00 |
| Signalman Volksmodem | $ 59.00 |
| Volksmodem Cable to Atari w/o 850 | $ 35.00 |
| Volksmodem Cable (Specify Computer) | $ 10.00 |

## Fans/Surge Protectors:

| | |
|---|---|
| Kensington System Saver Fan | $ 65.00 |
| Super Cooling Fan w/2 outlets/Surge | $ 35.00 |
| Lemon Surge Protector | $45.00 |

## CPM Cards:

| | |
|---|---|
| ALS CPM 3.0 Card Version 3.0 | $269.00 |
| ALS Zcard II | $120.00 |
| CPM Card (Taiwan) Same as ZCard II | $ 79.00 |
| Microsoft Softcard | $225.00 |

## Ram Cards:

| | |
|---|---|
| Microsoft 16k Ram Card | $ 65.00 |
| Microsoft 256k Ram Card | $365.00 |
| MPC 16k Ram Card | $ 55.00 |
| Titam 128k Ram Card | $350.00 |
| Titan 128k+80 Col (IIe) | $285.00 |
| Titan 192k+80 Col (IIe) | $365.00 |
| 4164 200ns Rams | $ 5.25 |

## 80 Column Cards

| | |
|---|---|
| ALS Smarterm II | $129.00 |
| Videx 80 Column Card | $179.00 |
| Videx 80 Column Card w/Inver/SoftSW | $209.00 |
| Videx Ultraterm (160col. Card) | $239.00 |

## Printer/Serial Cards:

| | |
|---|---|
| ALS Dispatcher Serial Card | $ 89.00 |
| MA Systems Omnigraph (Same as Grappler) | $ 79.00 |
| MPC Parallel Printer Card/Cable | $ 55.00 |
| Orange Micro Grappler Plus | $110.00 |
| Orange Micro Buffered Grappler Plus | $175.00 |
| Tymac Connection Commodore to Printer | $ 99.00 |
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| Apple Brand Disk Controller Card | $ 55.00 |
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| Elephant Products: Disk Type | 1-9 Boxes | 10-19 Boxes | 20+ Boxes |
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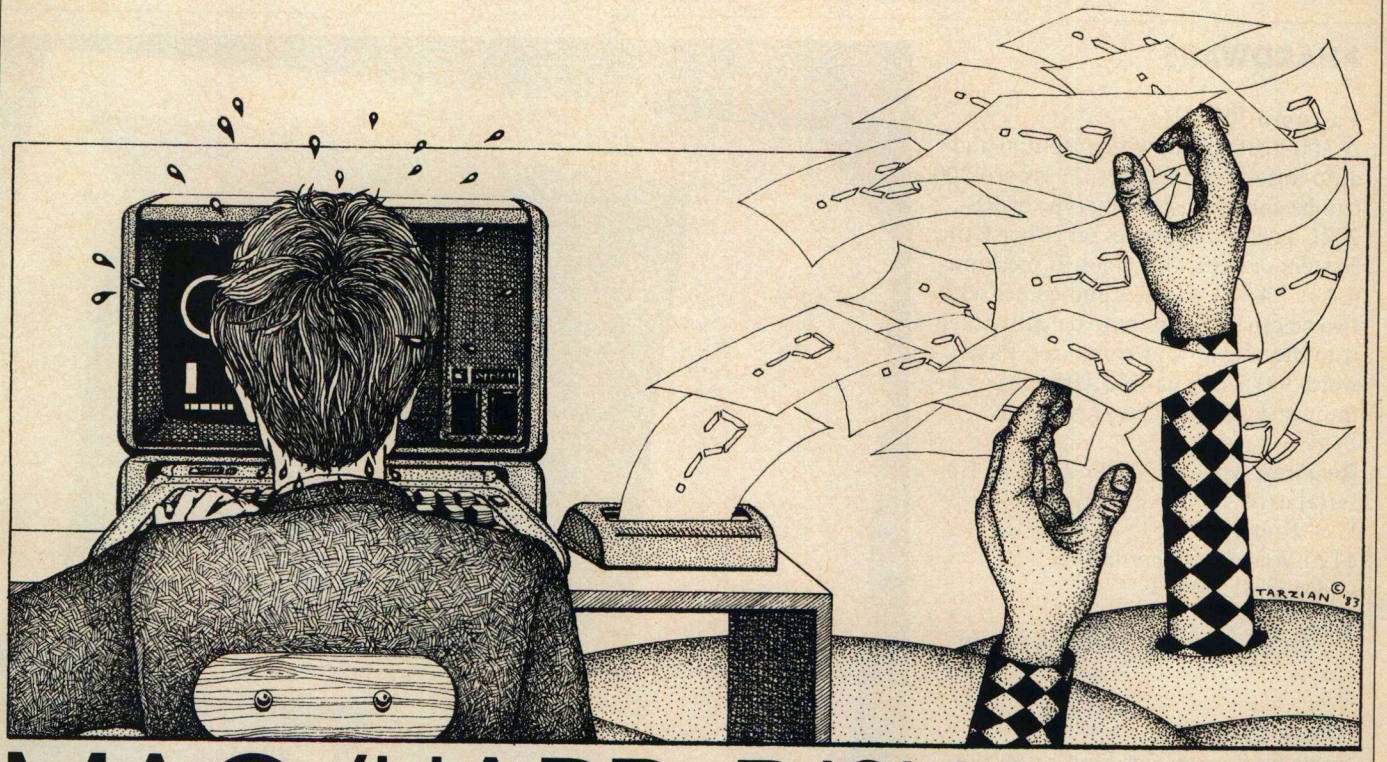
**RESCUE SQUAD**
**BY FREDERIC E. DAVIS**
Questions from our readers




# MAC/HARD DISK WOES

**Q.** *I recently bought a five-megabyte hard-disk drive for my Macintosh. I use MacWrite for writing some letters and reports, I use MacPaint for creating graphics of all types (sometimes just doodling) and I've just bought the Omnis database program for file management. The hard disk seemed great, since it helped speed up a lot of my work. Programs and documents seemed to load and run quite a bit faster.*

*The most enjoyable part of using the Macintosh is using MacPaint. Using MacPaint with a single-drive Mac is relatively laborious (much diskette swapping involved), so I thought the hard disk would really be the answer to my prayers. At first it was, but now I'm beginning to have serious problems. I have several diskettes' worth of my own graphics and doodling, and I just bought six diskettes of clip art from various vendors. Well, I loaded my own diskettes onto the hard disk and everything seemed fine, but after I loaded four of the six clip-art diskettes, the Mac started acting weird. It would quit in the middle of the copying process and give me several strange error messages. MacPaint gave the error message* MacPaint can't find work space on the default drive. *MacWrite would stop after the saving-document-to-disk stage and tell me* This document can't be printed. *Finally, I was left with an empty dialog box with a bomb in it, but nothing else! I thought I might have overloaded the hard disk, but when I rebooted the system, the Mac reported that there were about 1.5 megabytes of unused disk space on the hard disk. What's wrong with my hard disk? Why can't I fill it up to capacity?*

**A.** Nothing is wrong with your hard disk; the problem is with the finder, which is the Macintosh's operating system. The current version of the finder (version 1.1g at the time of this writing) has a few drawbacks. One is that you can have only about 200 directory entries (folders, documents and so on) before the finder gets lost. Sometimes, if your filenames are especially long, the finder can get lost after only 100 or so directory entries. The finder keeps track of all the directory entries at once and puts that information in RAM. The 128K RAM in the Macintosh limits the amount of space that the finder has available for keeping track of directory entries. Apple claims to be working on the finder, and the 512K Macintoshes will probably not have this problem.

For the time being, you can try giving your documents shorter names so the finder can fit more names into the Mac's precious 128K RAM. You may be able to squeeze more directory entries in this way. As to using all the space on your hard disk, you can fill the disk up with longer files, such as lengthy data files you create with Omnis.

Until Apple upgrades the finder, you can fill your hard disk with a few long database files, but you can't fill it with a whole lot of short (e.g., MacPaint, MacWrite) files. You should remove some of the files from the hard disk and transfer them to a diskette, which should help alleviate the problem for the time being. ✚

*Please send your questions and problems to Rescue Squad, A+, 11 Davis Drive, Belmont, CA 94002.*

DONNA TARZIAN

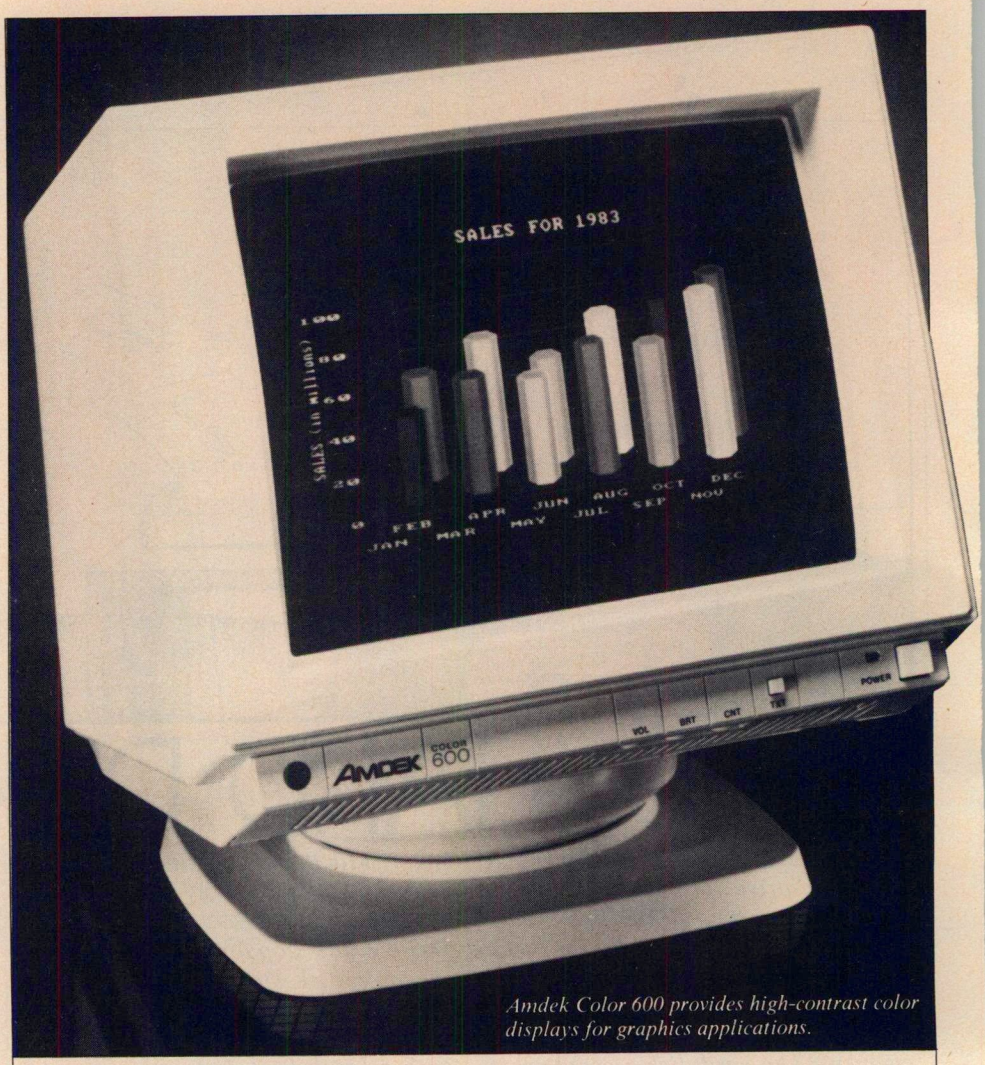
## HARDWARE

**Password 300**
A 300-bps modem with auto-dial and auto-answer capabilities, Password 300 can be configured to any type of RS-232C port and operates on either Bell System or dedicated lines. It measures 4.4 × 7.4 × 1.4 inches and comes with two velcro strips so that you can attach it to the side of your computer. Password 300 is compatible with most communications software. *(List Price: $199)*
**Requires:** Apple II, II Plus, IIe, or IIc; serial card
U.S. Robotics, Inc.
1123 West Washington Blvd.
Chicago, IL 60607
(312) 733-0497
CIRCLE 930 ON READER SERVICE CARD

**Amdek Color 600**
Some features of this high-resolution RGB color monitor are a CRT that provides vivid, high-contrast color displays for graphics applications, a switch that changes text color from white to green for easier reading, a built-in audio amplifier and speaker, and front-mounted operator controls. *(List Price: $650)*
**Requires:** Apple II, II Plus, IIe, or IIc; RBG interface card
Amdek Corporation
2201 Lively Blvd.
Elk Grove Village, IL 60007
(312) 595-6890
CIRCLE 931 ON READER SERVICE CARD

**SuperCable**
A serial-outlet cable with standard couplings, SuperCable allows you to attach your Apple IIc to a number of printers, including Epson, Olympia RO, Brother, and Okidata.

SuperCables, manufactured with shielded cable and using 24-gauge wire and gold-plated pin connectors, meet all current FCC shielding specifications. *(List Price: $39.95)*
**Requires:** Apple IIc, printer
Cord Ltd.
2815 Junipero Avenue, Suite 102
Signal Hill, CA 90806
(213) 595-4446
CIRCLE 932 ON READER SERVICE CARD



*Amdek Color 600 provides high-contrast color displays for graphics applications.*

## HARDWARE/SOFTWARE

**Communications Package for IIc**
This hardware/software communications package includes a Hayes Smartmodem 300, a power pack, all necessary cables, and Hayes Smartcom I communications software.

The Smartcom I software takes advantage of the Smartmodem 300's ability to automatically place, answer, and end calls.

The program accommodates touch-tone, pulse, or combination dialing; remembers the last number dialed; automatically retries until a connection is made; and lets users create, erase, display, print, send, and receive files.

The Smartmodem 300 is Bell 103-compatible in the Originate or Answer mode and connects directly to modular phone jacks. *(List Price: IIc Communications Bundle, $339)*
**Requires:** Apple IIc
Hayes Microcomputer Products, Inc.
5923 Peachtree Industrial Blvd.
Norcross, GA 30092
(404) 449-8791
CIRCLE 933 ON READER SERVICE CARD

**Computer Sheet Music**
Designed to provide beginning keyboard students with an easy-to-use and entertaining way to play and enjoy music, Computer Sheet Music consists of software, recorded music, and custom music books that can be used with any MIDI keyboard; Passport MIDI interface card; and an Apple II, II Plus, or IIe. All of the songs from the music book are stored on disk and can be dis-

played in big-note, easy-to-play notation along with chords.

In the Play mode, the computer displays the music, and you can select the tempo and play along with the display. The computer changes the note color as you play the notes correctly. In the Learn mode, the computer takes you through the music either one note at a time or continuously.

The first package of Computer Sheet Music is the "Michael Jackson—Thriller" program, which includes all of the songs from that album. *(List Price: Computer Sheet Music, $29.95; Passport MIDI Interface Card, $195)*
**Requires:** Apple II, II Plus, or IIe; 48K RAM; one disk drive; MIDI keyboard; Passport MIDI Interface Card
Passport Designs
625 Miramontes Street, Suite 103
Half Moon Bay, CA 94019
(415) 726-0280

CIRCLE 934 ON READER SERVICE CARD

**RGB Interface for the IIc**
The RGB Interface improves the video output of the Apple IIc by removing the extraneous colors in low- and medium-resolution applications and by displaying tinge-free 40- or 80-column text in the lower four lines in the Mix mode. Users can employ their RGB monitor as a monochrome monitor for 80-column text or for RGB color graphs and charts.

A demonstration diskette accompanies the interface. A set of double-density drivers allows easy access from Applesoft to the Apple IIc's double-density video modes. *(List Price: $199.95)*
**Requires:** Apple IIc, 128K RAM, Apple-compatible monitor with Apple III cable
Video-7 Incorporated
12340 Saratoga Sunnyvale Road
Suite 1
Saratoga, CA 95070
(408) 725-1433

CIRCLE 935 ON READER SERVICE CARD

*Varicalc solves science, engineering, and business equations.*

**Era 2**
A communications product for the Apple IIe, Era 2 includes communications software, a 1200-bps on-board modem, a users' manual, and a telephone cord. Era 2 features include auto-answer, originate-answer, pulse or tone dialing, and on-line printer control.

Users can send, receive, display, and print files; set communications parameters such as transmission rate, flow control, character format, parity, and answer-back; and display, print, delete, and rename files. *(List Price: $429)*
**Requires:** Apple IIe, 64K RAM, one disk drive
Microcom, Inc.
1400A Providence Highway
Norwood, MA 02062
(617) 762-9310

CIRCLE 936 ON READER SERVICE CARD

## ▶SOFTWARE

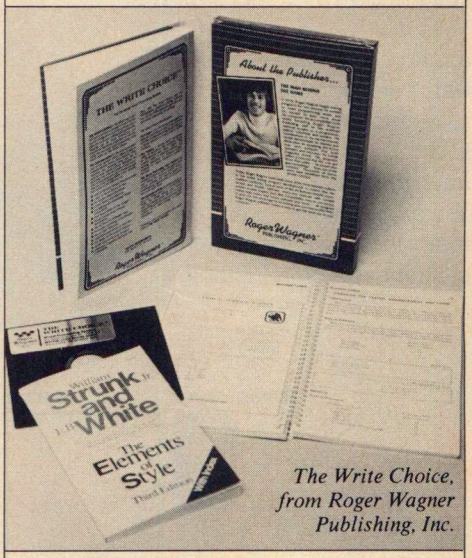
**Varicalc**
Interactive Microware announces its new program that interactively solves science, engineering, and business equations. Varicalc can simulate complex physical, chemical, or mathematical processes as well as accept real-time input directly into a predefined model.

Varicalc solves for any one of 19 variables on the right or left side of a formula without rearranging the formula. Users can plot results on a high-resolution graphics screen or any text screen. Up to 255 equations store on disk for quick recall. *(List Price: $100)*
**Requires:** Apple II Plus or IIe, 48K RAM; one disk drive; DOS 3.3
Interactive Microware
P.O. Box 139
State College, PA 16804-0139
(814) 238-8294

CIRCLE 937 ON READER SERVICE CARD

**The Write Choice**
A combination word-processing and typing-instruction program, The Write Choice provides users with the proper formats for written documents, correct grammar, punctuation rules, composition style tips, and interactive typing tutorials.

The typing tutor, Tut's Typer, features an arcade game to test your typing skill, tutorials for Dvorak and QWERTY keyboards, and an interactive keyboard drill that shows the proper finger placement for each key.



*The Write Choice, from Roger Wagner Publishing, Inc.*

The word processor, which can be used to prepare letters, forms, term papers, and résumés, supports both 40-column and 80-column screen displays as well as on-screen formatting. *(List Price: $44.95)*
**Requires:** Apple II, II Plus, IIe, or IIc; 48K RAM; one disk drive
Roger Wagner Publishing, Inc.
10761 Woodside Avenue, Suite E
P.O. Box 582
Santee, CA 92071
(619) 562-3670

CIRCLE 938 ON READER SERVICE CARD

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# What made over 100,000 Apple II owners fall in love with System Saver?

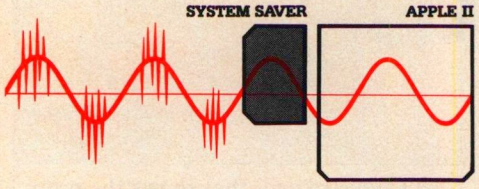
**It's the most versatile, most convenient, most useful peripheral ever made for the Apple.®**

**System Saver® filters out damaging AC line noise and power surges.**

70-90% of all microcomputer malfunctions can be traced to power line problems.* Problems your System Saver guards against.

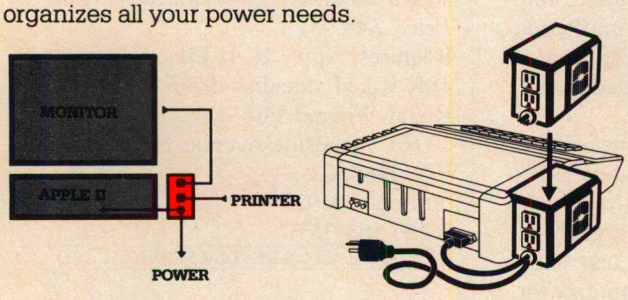
Power line noise can often be interpreted as data. This confuses your computer and produces system errors. Power surges and spikes can cause severe damage to your Apple's delicate circuitry and lead to costly servicing.

System Saver clips surges and spikes at a 130 Volts RMS/175 Volts dc level. A PI type filter attenuates common and transverse mode noise by a minimum of 30 dB from 600 kHz to 20 mHz with a maximum attenuation of 50 dB. You end up with an Apple that's more accurate, more efficient and more reliable.




**System Saver makes your Apple more convenient to use.**

No more reaching around to the back of your Apple to turn it on. No more fumbling for outlets and cords to plug in your monitor and printer. System Saver organizes all your power needs.

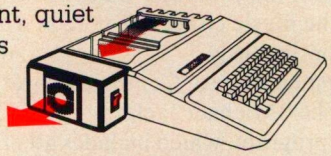


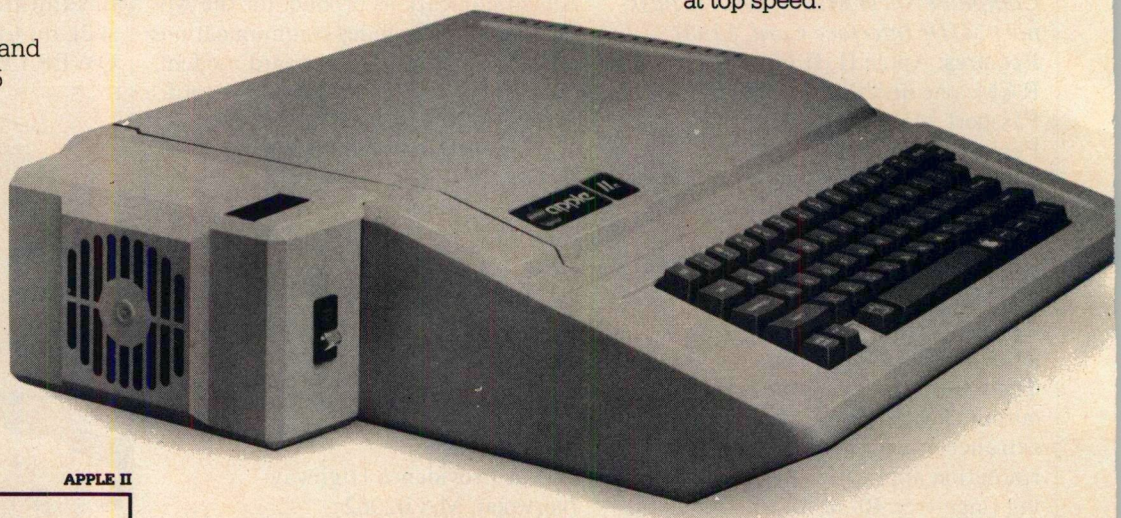

It functions as a multi-outlet power strip with two switched outlets. Plus System Saver offers the ultimate convenience; a front mounted power switch for fingertip control of your entire system.

**System Saver lets your Apple keep its cool.**

Today's advanced peripheral cards generate heat. In addition, the cards block any natural air flow through the Apple IIe creating high temperature conditions that shorten the life of the Apple and peripheral cards.

System Saver's efficient, quiet fan draws fresh air across the mother board, over the power supply and out the side ventilation slots. It leaves your Apple cool, calm and running at top speed.





So if you want to keep damaging heat, line noise and power surges out of your system for good, pick up the only peripheral that's in use every second your computer is in use. The System Saver. You'll soon come to think of it as the piece Apple forgot.

**Compatible with Apple stand**

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*PC Magazine: March 1983.

System Saver is UL Listed. System Saver's surge suppression circuitry conforms to IEEE specification 507 1980, Category A. Available in 220/240 Volts, 50/60 Hz.

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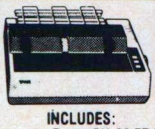

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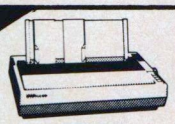

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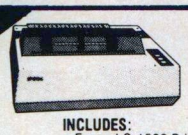

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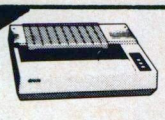

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# PRODUCT NEWS

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**Requires:** Apple II, II Plus, or IIe; 48K RAM; one disk drive

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This typing tutorial includes 18 lessons for the standard QWERTY keyboard and 5 lessons for the Dvorak keyboard. MasterType teaches typing and keyboard skills through an arcade-game format. *(List Price: $39.95)*

**Requires:** Apple II, II Plus, IIe, or IIc; 48K RAM; one disk drive

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Apple IIe and IIc users can now obtain this enhanced ProDOS-based version of Apple Writer, the word-processing program that creates, edits, stores, and


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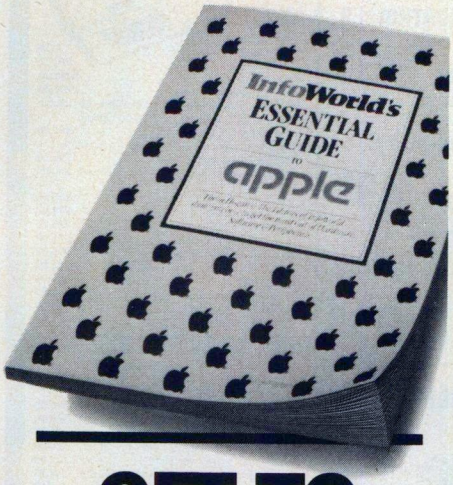


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## PRODUCT NEWS

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New features include horizontal scrolling; a terminal mode so users can access information services from within Apple Writer; the ability to format a ProDOS disk—for users who do not own the ProDOS user's diskette; and a Catalyst IIe utility file for easy installation of Apple Writer onto the ProFile. *(List Price: $149. From now to February 1, 1985, current Apple Writer IIe users can upgrade to the new 2.0 version for $50.)*

**Requires:** Apple IIe or IIc; 64K RAM; one disk drive

Apple Computer, Inc.
20525 Mariani Avenue
Cupertino, CA 95014-2094
(408) 996-1010

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This database program for philatelists consists of six programs with which users can enter, delete, change, search, sort, and print in multiple formats their collection information. It can also catalog foreign and domestic lists by denomination, country, description, year, value, and source. The Meeting List allows you to sort and select meetings by date and location. The Source List gives sources for stamps and supplies and information on trades and liquidations. With File Transfer, you can transmit data to other computers over the telephone. *(List Price: $49)*

**Requires:** Apple II or IIe, 48K RAM, one disk drive, printer optional

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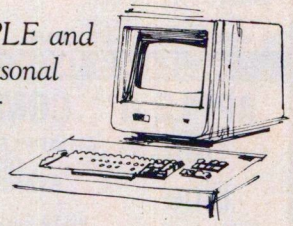

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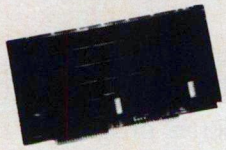

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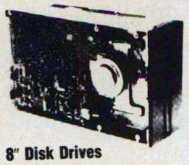

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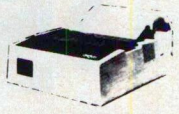

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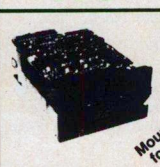

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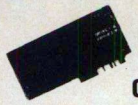

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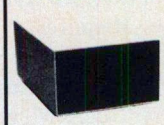

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P.O. Box 28
Princeton, NJ 08540
(800) 257-5295, in NJ (609) 921-6500
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**Facts Files 2**
Facts Files 2, a mini-database program for the Apple II series of computers, is designed for home or business use. Using Facts Files 2, you can create mailing lists, disk-directory files, income-tax records, inventory files, and customized record forms. Some features of Facts Files 2 are on-line documentation, up to 13 fields in each records, and quick search. *(List Price: $24.95)*
DiNess Software Company
P.O. Box 5671
Fort Smith, AK 72913
(501) 441-9846
CIRCLE 945 ON READER SERVICE CARD

**Multigraph**
Multigraph automatically produces graphs from data entered manually or from a file. Bar graphs use up to four groups of data. Other graphs can use up to six groups. *(List Price: $150)*
**Requires:** Apple II, II Plus, IIe, or IIc; 64K RAM; two disk drives
Microlab Computer Products
2699 Skokie Valley Road
Highland Park, IL 60035
(312) 433-7550
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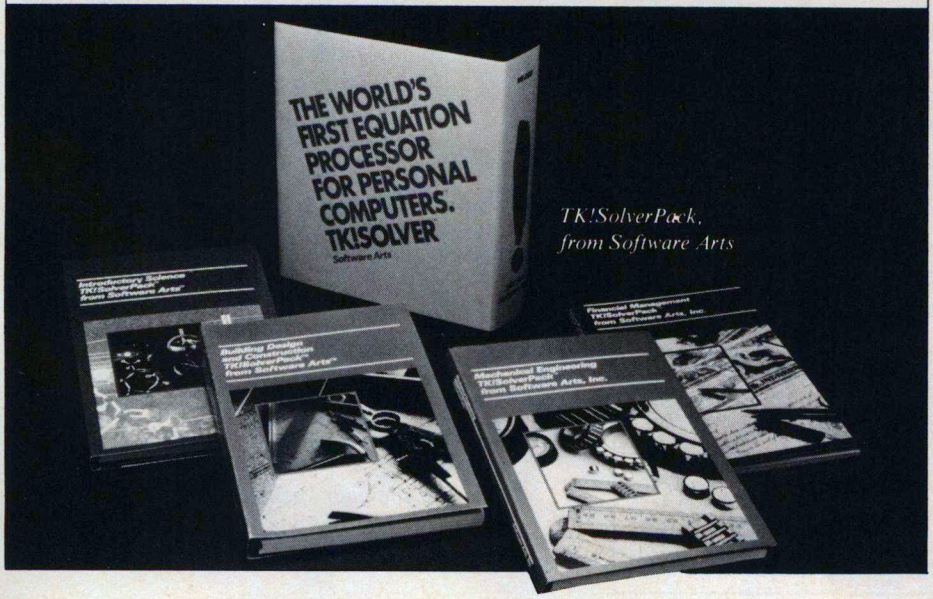
**Requires:** Apple IIe, 128K RAM, one disk drive, TK!Solver
Software Arts
27 Mica Lane
Wellesley, MA 02181
(617) 237-4000
CIRCLE 947 ON READER SERVICE CARD





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**Requires:** Apple II, II Plus, or IIe; 48K RAM; one disk drive; DOS 3.3
Star Point Technology
4730 Grannan Way
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# PRODUCT NEWS

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**Requires:** Apple II, II Plus, IIe, or IIc; 64K RAM; one disk drive
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**Requires:** Apple II, II Plus, IIe, or IIc; 64K RAM; one disk drive
Human Engineered Software
150 North Hill Drive
Brisbane, CA 94005
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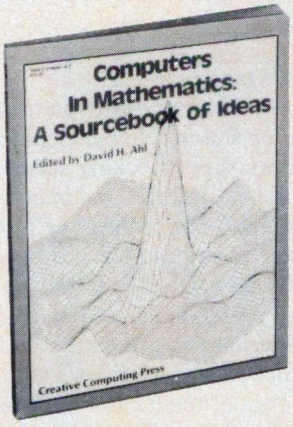


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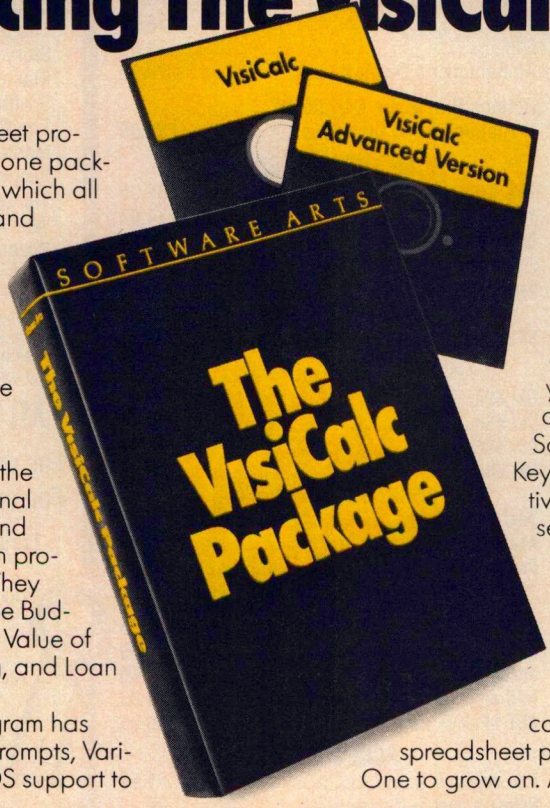


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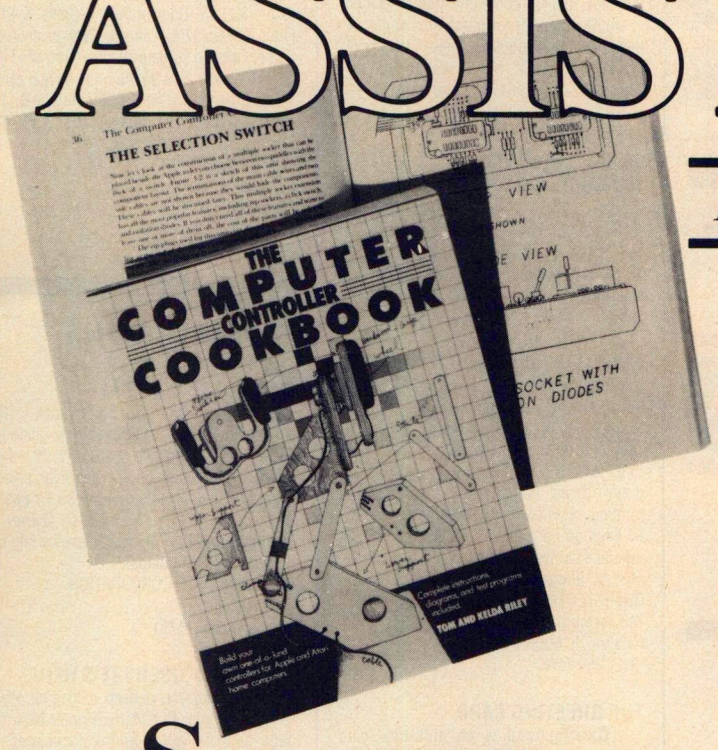


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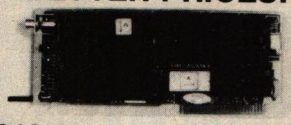

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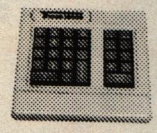

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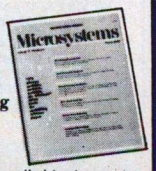


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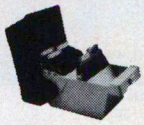

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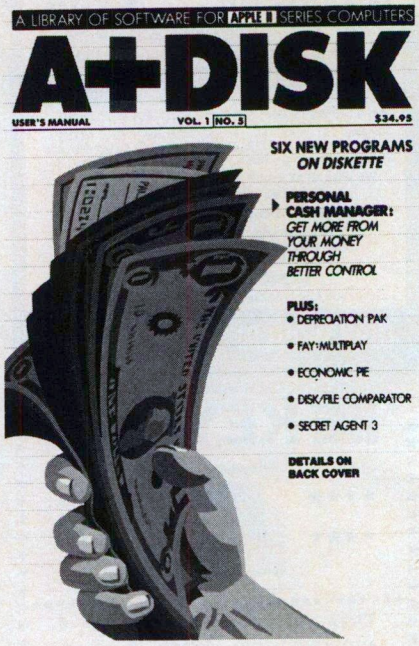


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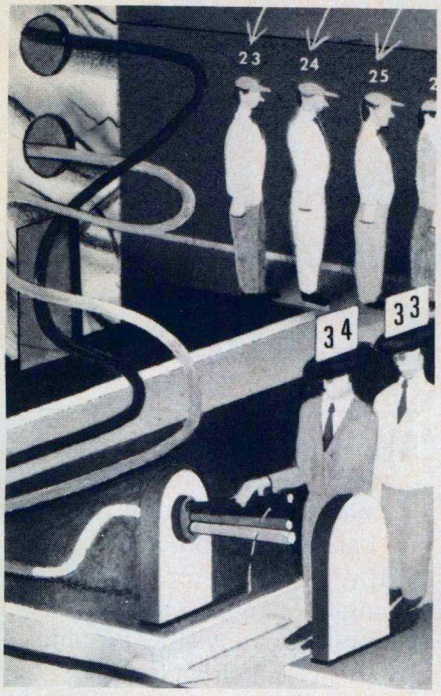


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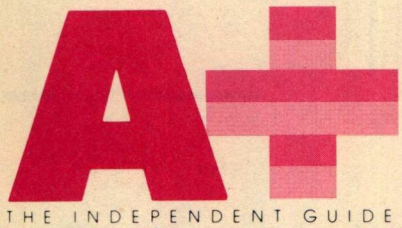

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For a reprint of the full review, or to order Format-II, contact: Kensington Microware, Ltd. 251 Park Avenue South, NYC, NY 10010, (212) 475-5200.

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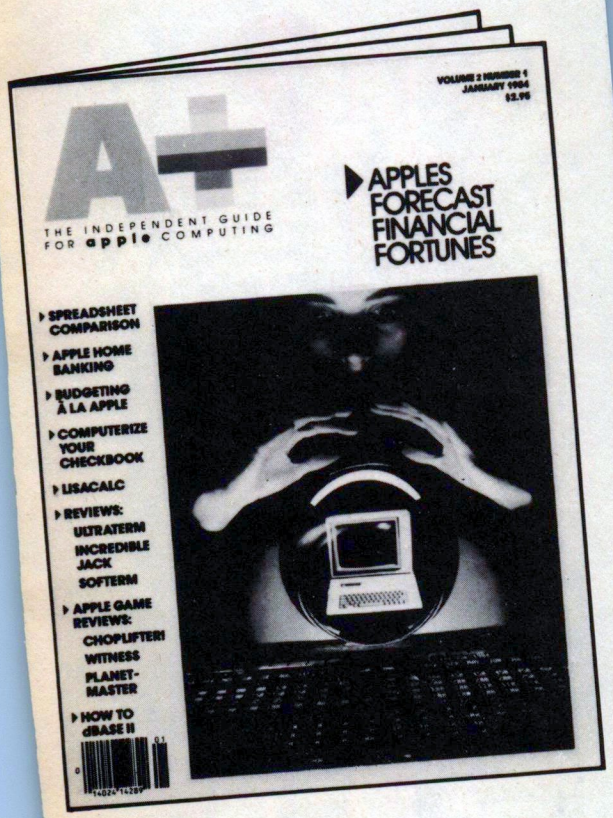


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